CHAPTER-1 : KNOWING OUR NUMBERS

Exercise-1

1. Write each number in words and express it in expanded form.

(a) Seventy six thousand two hundred fifty four.
Expanded form : 70,000 + 6,000 + 200 + 50 + 4

(b) Two lakh twelve thousand seven hundred forty five.
Expanded form : 2,00,000 + 10,000 + 2,000 + 700 + 40 + 5

(c) Fifteen lakh five thousand three hundred sixty four.
Expanded form : 10,00,000 + 5,00,000 + 0 + 5,000 + 300 + 60 + 4

(d) Ten lakh forty one thousand five hundred twenty one.
Expanded form : 10,00,000 + 40,000 + 1000 + 500 + 20 + 1

(e) Five crore twelve lakh seventy four thousand four hundred fifty one.
Expanded form : 5,00,00,000 + 10,00,000 + 2,00,000 + 70,000 + 4,000 + 400 + 50 + 1

(f) Seven lakh thirty eight thousand one hundred fifty two.
Expanded form : 7,00,000 + 30,000 + 8000 + 100 + 50 + 2

2. Fill in the blanks :

(a) 10 (b) 100 (c) 1000 (d) 1 (e) 10 (f) 100

3. In the following numbers, insert commas properly and write their number names according to the Indian System of Numeration :

(a) 8,53,69,450 : Eight crore fifty three lakh sixty nine thousand four hundred fifty
(b) 67,23,453 : Sixty seven lakh twenty three thousand four hundred fifty three
(c) 88,888 : Eighty eight thousand eight hundred eighty eight
(d) 95,46,283 : Ninety five lakh forty six thousand two hundred eighty three
(e) 8,99,00,046 : Eight crore ninety nine lakh forty six
(f) 58,735 : Fifty eight thousand seven hundred thirty five

4. In the following number, insert commas properly and write their number names according to the International System of Numeration :

(a) 960,051,221 : Nine hundred sixty million fifty one thousand two hundred twenty one
(b) 753,645 : Seven hundred fifty three thousand six hundred forty five
(c) 9,051,521 : Nine million fifty one thousand five hundred twenty one
(d) 67,345,982 : Sixty seven million three hundred forty five thousand nine hundred eighty two
(e) 8,989,627 : Eight million nine hundred eighty nine thousand, six hundred twenty seven

5. Write the numerals for following number names placing comas :

(a) 53,15,08,007 (b) 207,752,180 (c) 16,00,423 (d) 8,342,000 (f) 65,90,010

6. Write the following number names using the Indian system of numeration :

(a) 86,512 (b) 4,32,678 (c) 6,384 (d) 20,04,008

7. Find the place value and face value of the colour digit in each of the following numbers :

(a) **9**587412

M	Hth	Tth	Th	H	T	O
9	5	8	7	4	1	2

Place value of $9 = 9$ million $= 9 \times 1000000 = 9000000$

Face value of $9 = 9$

(b) 5**8**11364

M	Hth	Tth	Th	H	T	O
5	**8**	1	1	3	6	4

Place value of $8 = 8$ lakh $= 8 \times 100000 = 800000$

Face value of $8 = 8$

(c) 799**9**581

M	Hth	Tth	Th	H	T	O
7	9	9	**9**	5	8	1

Place value of $9 = 9$ thousand $= 9 \times 1000 = 9000$

Face value of $9 = 9$

(d) 8**5**0319

Hth	Tth	Th	H	T	O
8	**5**	0	3	1	9

Place value of $5 = 5$ thousand $= 5 \times 10000 = 50000$

Face value of $5 = 5$

(e) 63**1**562

Hth	Tth	Th	H	T	O
6	3	**1**	5	6	2

Place value of $1 = 1$ thousand $= 1 \times 1000 = 1000$

Face value of $1 = 1$

(f) **8**111581

M	Hth	Tth	Th	H	T	O
8	1	1	1	5	8	1

Place value of $8 = 8$ million $= 8 \times 1000000 = 8000000$

Face value of $8 = 8$

8. Find the difference between the place value and face value of 6 in each of the following numbers :

(a) 867412

Place value of $6 = 6 \times 1000 = 60000$

Face value of $6 = 6$

Difference between the place value and face value $= 60000 - 6 = 59994$

(b) 61384

Place value of $6 = 6 \times 10000 = 60000$

Face value of $6 = 6$

Difference between the place value and Face value $= 60000 - 6 = 59994$

(c) 9869581

Place value of $6 = 6 \times 10000 = 60000$

Face value of $6 = 6$

Difference between the place value and face value $= 60000 - 6 = 59994$

9. Rewrite the following numbers in words using International place-value chart :

(a) Eighty one million five hundred thousand seven hundred fifty six

(b) One million four hundred thirty five thousand fifteen

(c) Sixty one million seven hundred thousand eight hundred twenty five

10. Complete the following table by writing the short form of the given number :

(a) 329742 (b) 3705160 (c) 24000432 (d) 800305050

Exercise-2

1. Estimate the following numbers to the nearest tens :

(a) 62 is rounded off to the nearest tens as 60

(b) 79 is rounded off to the nearest tens as 80

(c) 216 is rounded off to the nearest tens as 220

(d) 99 is rounded off to the nearest tens as 100

(e) 86 is rounded off to the nearest tens as 90

(f) 8315 is rounded off to the nearest tens as 8320

(g) 56 is rounded off to the nearest tens as 60

(h) 126 is rounded off to the nearest tens as 130

2. Estimate the following numbers to the hundreds :

(a) 433 is rounded off to the nearest hundreds as 400

(b) 136 is rounded off to the nearest hundreds as 100

(c) 785 is rounded off to the nearest hundreds as 800

(d) 745 is rounded off to the nearest hundreds as 700

(e) 931 is rounded off to the nearest hundreds as 900

(f) 5693 is rounded off to the nearest hundreds as 5700

(g) 7168 is rounded off to the nearest hundreds as 7200

(h) 69879 is rounded off to the nearest hundreds as 69900

3. Estimate the following numbers to the thousands :

(a) 4432 is rounded off to the nearest thousands as 4000

(b) 2834 is rounded off to the nearest thousands as 3000

(c) 67835 is rounded off to the nearest thousands as 68000

(d) 1356 is rounded off to the nearest thousands as 1000

(e) 8160 is rounded off to the nearest thousands as 8000

(f) 75438 is rounded off to the nearest thousands as 75000

(g) 34872 is rounded off to the nearest thousands as 35000

(h) 97640 is rounded off to the nearest thousands as 98000

4. Check if the following rounding off is correct or not. Correct the wrong ones :

(a) Incorrect (b) Correct (c) Incorrect (d) Incorrect (e) Correct

(f) Correct (g) Incorrect (h) Correct

Exercise-3

1. Estimate the following sums to the nearest tens :

(a) To estimate : $37 + 59$

We round off the numbers to the nearest tens.

$37 \longrightarrow 40$

$59 \longrightarrow 60$

So, $40 + 60 = 100$

$\therefore$ Estimated sum is 100.

(b) To estimate : $77 + 89$

We round off the numbers to the nearest tens.

$77 \longrightarrow 80$

$89 \longrightarrow 90$

So, $80 + 90 = 170$

$\therefore$ Estimated sum is 170.

(c) To estimate : $458 + 939$

We round off the numbers to the nearest tens.

$458 \longrightarrow 460$

$939 \longrightarrow 940$

So, $460 + 940 = 1400$

$\therefore$ Estimated sum is 1400.

(d) To estimate : $2134 + 884$

We round off the numbers to the nearest tens.

$2134 \longrightarrow 2130$

$884 \longrightarrow 880$

So, $2130 + 880 = 3010$

$\therefore$ Estimated sum is 3010.

2. Estimate the following sums to the nearest hundreds :

(a) To estimate : $533 + 785$

We round off the numbers to the nearest hundreds.

$533 \longrightarrow 500$

$785 \longrightarrow 800$

So, $500 + 800 = 1300$

$\therefore$ Estimated sum is 1300.

(b) To estimate : $3394 + 5342$

We round off the numbers to the nearest hundreds.

$3394 \longrightarrow 3400$

$5342 \longrightarrow 5300$

So, $3400 + 5300 = 8700$

$\therefore$ Estimated sum is 8700.

(c) To estimate : $5693 + 4695$

We round off the numbers to the nearest hundreds.

$5693 \longrightarrow 5700$

$4695 \longrightarrow 4700$

So, $5700 + 4700 = 10400$

$\therefore$ Estimated sum is 10400.

(d) To estimate : $89879 + 76382$

We round off the numbers to the nearest hundreds.

$89879 \longrightarrow 89900$

$76382 \longrightarrow 76400$

So, $89900 + 76400 = 166300$

$\therefore$ Estimated sum is 166300.

3. Estimate each difference to the nearest thousands :

(a) To estimate : $3574 - 2834$

We round off the numbers to the nearest thousands.

$3574 \longrightarrow 4000$

$2834 \longrightarrow 3000$

So, $4000 - 3000 = 1000$

$\therefore$ Estimated difference is 1000.

(b) To estimate : $67835 - 23847$

We round off the numbers to the nearest thousands.

$67835 \longrightarrow 68000$

$23847 \longrightarrow 24000$

So, $68000 - 24000 = 44000$

$\therefore$ Estimated difference is 44000.

(c) To estimate : $97640 - 65438$

We round off the numbers to the nearest thousands.

$97640 \longrightarrow 98000$

$65438 \longrightarrow 65000$

So, $98000 - 65000 = 33000$

$\therefore$ Estimated difference is 33000.

(d) To estimate : $4384 - 2984$

We round off the numbers to the nearest thousands.

$4384 \longrightarrow 4000$

$2984 \longrightarrow 3000$

So, $4000 - 3000 = 1000$

$\therefore$ Estimated difference is 1000.

4. Find the estimated quotient for each of the following by rounding off each number to its greatest place :

(a) To estimate : $97 \div 38$

We round off the numbers to nearest tens.

$97 \longrightarrow 100$

$38 \longrightarrow 40$

$\therefore$ Estimated quotient $= 100 \div 40 = 2$

Hence estimated quotient = 2.

(b) To estimate : $785 \div 63$

$785 \longrightarrow 800$

$63 \longrightarrow 60$

$\therefore$ Estimated quotient $= 800 \div 60 = 13$

Hence estimated quotient = 13.

(c) To estimate : $1870 \div 13$

$1870 \longrightarrow 2000$

$13 \longrightarrow 10$

$\therefore$ Estimated quotient $= 2000 \div 10 = 200$

Hence estimated quotient = 200.

(d) To estimate : $5341 \div 498$

$5341 \longrightarrow 5000$

$498 \longrightarrow 500$

$\therefore$ Estimated quotient $= 5000 \div 500 = 10$

Hence estimated quotient = 10.

5. Amit buys branded shirt = ₹ 585

Amit buys a pair of shoes = ₹ 820

Estimate the total cost of both

$585 \longrightarrow 600$

$820 \longrightarrow 800$

Estimated total cost of both = 600 + 800 = 1400

Hence estimated total cost = 1400.

6. Total operators in a company = 44298

Females in a company = 31560

To estimate the number of males.

We round off the number to nearest hundreds

$44298 \longrightarrow 44300$

$31560 \longrightarrow 31600$

Estimated number of males = total operators – females in the company

= 44300 – 31600 = 12700

EXERCISE-4

1. Fill in the blanks with proper sign <, > and = :

(a) < (b) < (c) > (d) < (e) = (f) > (g) < (h) =

2. Circle the greatest and tick (✓) the smallest numbers in each of the following :

(a) 3219, 2050✓, (87456), 9875

(b) 67853, (98547), 95123, 12535✓

(c) 5693, (8574), 4695, 3574✓

(d) 76382, (89879), 54125✓, 65884

3. Arrange the following numbers in ascending order :

(a) 2856, 3895, 4857, 25685, 58925

(b) 11561, 25854, 65602, 72251, 74581

(c) 2354, 4512, 6543, 9574, 9764

(d) 2984, 4384, 6125, 7154, 8541

4. Arrange the following numbers in descending order :

(a) 7856, 7514, 6957, 3615, 2542

(b) 84581, 63251, 55602, 35854, 14254

(c) 92547, 88715, 65321, 1989,561

(d) 65425, 51980, 45412, 27906, 9152

5. Use the given digits to make the greatest and the smallest 5-digit numbers without repitition of digits :

(a) Greatest number = 95431; Smallest number = 13459

(b) Greatest number = 85431; Smallest number = 13458

(c) Greatest number = 98654; Smallest number = 45689

(d) Greatest number = 85421; Smallest number = 12458

(e) Greatest number = 87543; Smallest number = 34578

(f) Greatest number = 65421; Smallest number = 12456

(g) Greatest number = 98432; Smallest number = 23489

(h) Greatest number = 75432; Smallest number = 23457

6. To form the smallest 7-digit number from four digits, we should take the our smallest digits which are 0, 1, 2, 3.

Hence the required 7-digit number is 1000023.

7. The required smallest 4-digit numbers from four digits are 4564, 5646, 6564, 4456, 4465, 5564, 5546, 6645, 6654, 5464, 5465, 6456, 4654, 5654, 4645.

EXERCISE-5

1. Change the following quantities into the required units :

(a) 45000 cm into m

$$1 \text{ cm} = \frac{1}{100} \text{ m}$$

$$45000 \text{ cm} = 45000 \times \frac{1}{100} \text{ m}$$

$$= 450 \text{ m}$$

Thus, 45000 cm = 450 m **Ans.**

(b) 28000 g into kg

$$1\text{g} = \frac{1}{1000} \text{ kg}$$

$$28000 \text{ g} = 28000 \times \frac{1}{1000} \text{ kg} = 28 \text{ kg}$$

Thus, 28000 g = 28 kg **Ans.**

(c) 76000 m into km

$$1\text{m} = \frac{1}{1000} \text{ km}$$

$$76000 \text{ m} = 76000 \times \frac{1}{1000} \text{ km} = 76 \text{ km}$$

Thus, 76000 m = 76 km **Ans.**

(d) 6000 ml into L

$$1 \text{ ml} = \frac{1}{1000} \text{ L}$$

$$6000 \text{ ml} = 6000 \times \frac{1}{1000} \text{ L} = 6 \text{ L}$$

Thus, 6000 ml = 6 L **Ans.**

2. Rajat walked in a day = 800 m

a week = 7 days

Rajat walked in a week = 7×800 m

= 5600 m

= 5 km 600 m **Ans.**

3. Population of city A = 70,00,000

Population of city B = 17,00,000

Population of city C = 15, 12, 340

Total population of three cities

Population of city 'A' + population of city 'B' + population of city 'C'.

= 70,00,000 + 17,00,000 + 15,2,340

= 10,21,340

Thus, total population of the three cities = 10,21,340 **Ans.**

4. Mahesh used steel to construct his building = 2715 kg 400 g

Rinku used steel in his building = 5825 kg 250 g

The total of steel used by both of them = Mahesh used seel in his building + Rinku used steel in his building.

$$= 2715 \text{ kg } 400 \text{ g} + 5825 \text{ kg } 250 \text{ g}$$

$$= 8540 \text{ kg } 650 \text{ g}$$

Thus total steel used by Mahesh and Rinku in their building = 8540 kg 650 g

5. Shopkeeper had rice = 65 kg 520 g

$\because$ 1 kg = 1000 g

$\therefore$ 65 kg = 65×1000 g = 65000 g

So the shopkeeper had total rice in gram = 65000 g + 520 g

$$= 65, 520 \text{ g}$$

Distributed total rice = 9 customers

So, each customer will get rice = $\frac{65520}{9}$

$$= 7280 \text{ g}$$

$\because$ $$= \frac{7280}{1000} 1000 \text{ g} = 1 \text{ kg}$$

$$= 7 \text{ kg } 280 \text{ g}$$

Thus, each customer will get rice = 7 kg 280 g **Ans.**

6. One egg has a mass = 50 g

$\because$ 1 dozen eggs = 12 eggs

2 dozen eggs = 2×12

$$= 24 \text{ eggs}$$

So, mass of 24 eggs = $24 \times 50 = 1200$ g

Mass of 2 dozen eggs in gram = 1200 g

or Mass of 2 dozen eggs in kg

$$= \frac{1200}{1000} = 1 \cdot 2 \text{ kg}$$

$$= 1 \text{ kg } 200 \text{ g}$$ **Ans.**

EXERCISE-6

1. Write the roman numerals for each of the following :

(a) Roman number of 69 = 60 + 9

$$= \text{LX} + \text{IX}$$

$$= \text{LXIX}$$

(b) Roman number of 74 = 70 + 4

$$= \text{LXX} + \text{IV}$$

$$= \text{LXXIV}$$

(c) Roman number of $23 = 20 + 3$
$= XX + III$
$= XXIII$

(d) Roman number of $78 = 70 + 8$
$= LXX + VIII$
$= LXXVIII$

(e) Roman number of $990 = 900 + 90$
$= CM + XC$
$= CMXC$

(f) Roman number of 500
$= D$

(g) Roman number of $98 = 90 + 8$
$= XC + VIII$
$= XCVIII$

(h) Roman number of 600
$= DC$

(i) Roman number of $116 = 100 + 16$
$= C + XVI$
$= CXVI$

(j) Roman number of $88 = 80 + 8$
$= LXXX + VIII$
$= LXXXVIII$

(k) Roman number of 100
$= C$

(l) Roman number of $848 = 800 + 40 + 8$
$= DCCC + XL + VIII$
$= DCCCXLVIII$

2. Write the following in Hindu-Arabic numerals :

(a) Hindu-Arabic number of XLVII
$= XL + VII$
$= 40 + 7$
$= 47$

(b) Hindu-Arabic number of XXXII
$= XXX + II$
$= 30 + 2$
$= 32$

(c) Hindu-Arabic number of XCIX
$= XC + IX$
$= 90 + 9$
$= 99$

(d) Hindu-arabic number of XXVI
$= XX + VI$
$= 20 + 6$
$= 26$

(e) Hindu-Arabic number of LXXII

$= LXX + II$

$= 70 + 2$

$= 72$

(f) Hindu-Arabic number of LIX

$= L + IX$

$= 50 + 9$

$= 59$

(g) Hindu-Arabic number of CD

$= C + D$

$= 100 + 500$

$= 600$

(h) Hindu-Arabic number of XL

$= 40$

(i) Hindu-Arabic number of XXX

$= 30$

(j) Hindu-Arabic number of LXXXII

$= LXXX + II$

$= 80 + 2$

$= 82$

(k) Hindu-Arabic number of LI

$= L + I$

$= 50 + 1$

$= 51$

(l) Hindu-arabic number of LXIII

$= LX + III$

$= 60 + 3$

$= 63$

CHAPTER-2 : PLAYING WITH NUMBERS

Exercise-1

1. Using brackets, write mathematic expression for each of the following :

(i) $7\,(13-5)$ (ii) $36 \div (5+4)$

(iii) $81 \div [(6+2)+1]$ (iv) $(2 \times 9) - 8$

(v) $20 \div (7-2)$

2. Simplify the following expressions :

(i) $15 + (3 - \overline{5-3})$

$= 15 + (3-2)$ (Removing line brackets)

$= 15 + 1$ (Removing small brackets)

$= 16$ (Adding 15 and 1)

(ii) $10\,[6 + \{63 - 4\,(2 \times 6 + 3)\}]$

$= 10\,[6 + \{63 - 4 \times (12+3)\}]$ (Multiplying 2 and 6)

$= 10\,[6 + \{63 - 4 \times 15\}]$ [Adding 12 and 3]

(Removing small brackets)

$= 10\,[6 + \{63 - 60\}]$ (Multiplying 4 and 15)

$= 10\,[6 + 3]$ (Removing curly brackets)

$= 10 \times 9$ (Removing square brackets)

$= 90$ (Multiplying 10 and 9)

(iii) $81 + [159 - 2\,\{7 \times 8 + (13 - \overline{2 \times 5})\}]$

$= 81 + [159 - 2\,\{7 \times 8 + (13 - 10)\}]$ (Removing line brackets)

$= 81 + [159 - 2\,\{7 \times 8 + 3\}]$ (Removing small brackets)

$= 81 + [159 - 2 \times 59]$ (Removing curly brackets)

$= 81 + [159 - 118]$ (Multiplying 2 and 59)

$= 81 + 41$ (Removing square brackets)

$= 122$

(iv) $10 - [8 - \{6 \div 3 - (6 - 9 \div 3) \div 3\}]$

$= 10 - [8 - \{6 \div 3 - (6 - 3) \div 3\}]$ (Dividing 9 by 3)

$= 10 - [8 - \{6 \div 3 - 3 \div 3\}]$ (Removing small brackets)

$= 10 - [8 - \{6 \div 3 - 1\}]$ (Dividing 3 by 3)

$= 10 - [8 - \{2 - 1\}]$ (Dividing 6 by 3)

$= 10 - [8 - 1]$ (Removing curly brackets)

$= 10 - 7$ (Removing square brackets)

$= 3$

(v) $14 - [12 - \{9 - (7 - \overline{6 - 2})\}]$

$= 14 - [12 - \{9 - (7 - 4)\}]$ (Removing line brackets)

$= 14 - [12 - \{9 - 3\}]$ (Removing small brackets)

$= 14 - [12 - 6]$ (Removing curly brackets)

$= 14 - 6$ (Removing square brackets)

$= 8$

(vi) $16 - [11 - \{8 \div (17 + 3 \times 2 - 19)\}]$

$16 - [11 - \{8 \div (17 + 6 - 19)\}]$ (Multiplying 3 and 2)

$= 16 - [11 - \{8 \div (23 - 19)\}]$ (Adding 17 and 6)

$= 16 - [11 - \{8 \div 4\}]$ (Removing small brackets)

$= 16 - [11 - 2]$ (Removing curly brackets)

$= 16 - 9$ (Removing square brackets)

$= 7$ (Subtracting 9 from 16)

Exercise-2

1. Write all factors of each of the following numbers :

(i) Factors of 15

15×1 or 1×15

or 5×3 or 3×5

$\therefore$ The factors of 15 are = 1, 3, 5, 15

(ii) Factors of 24

24×1 or 1×24

or 2×12 or 12×2

or $3. \times 8$ or 8×3

4×6 or 6×4

$\therefore$ The factors of 24 are = 1, 2, 3, 4, 6, 8, 12, 24

(iii) The factors of 36 are

1×36 or 36×1

or 2×18 or 18×2

or 3×12 or 12×3

4×9 or 9×4

or 6×6

$\therefore$ Factors of 36 are = 1, 2, 3, 4, 6, 9, 12, 18, 36

(iv) The factors of 40 are

1×40 or 40×1

or 2×20 or 20×2

or 4×10 or 10×4

or 5×8 or 8×5

$\therefore$ Factors of 40 are = 1, 2, 4, 5, 8, 10, 20, 40

2. Which of following have 10 as a factor :

(i) $630 = 2 \times 5 \times 3 \times 3 \times 7$ or $10 \times 3 \times 3 \times 7$

[$\because$ $2 \times 5 = 10$]

$\therefore$ 10 is a factor of 630

(ii) $125 = 5 \times 5 \times 5$

$\because$ Clearly there is no factor of 10.

$\therefore$ 10 is not a factor of 125.

(iii) $200 = 2 \times 2 \times 2 \times 5 \times 5$ or

$= 10 \times 10 \times 2$

$\therefore$ 10 is a factor of 200.

3. Write first three multiples of the following :

(i) The first three multiples of '1'

$1 \times 1 = 1$

$1 \times 2 = 2$

$1 \times 3 = 3$

So, the first three multiples of 1 are 1, 2, 3.

(ii) The first three multiples of '9'

$9 \times 1 = 9$

$9 \times 2 = 18$

$9 \times 3 = 27$

So, the first three multiples of 9 are 9, 18, 27.

(iii) The first three multiples of 16

$16 \times 1 = 16$

$16 \times 2 = 32$

$16 \times 3 = 48$

So, The first three multiples of 16 are 16, 32, 48.

(iv) The first three multiples of '20'

$$20 \times 1 = 20$$
$$20 \times 2 = 40$$
$$20 \times 3 = 60$$

So, the first three multiples of 20 are 20, 40, 60.

4. List all numbers less than 100 that are multiples of :

(i) both 3 and 5

$$15 = 3 \times 5$$
$$30 = 2 \times 3 \times 5$$
$$45 = 3 \times 3 \times 5$$
$$60 = 2 \times 2 \times 3 \times 5$$
$$75 = 3 \times 5 \times 5$$
$$90 = 2 \times 3 \times 3 \times 5$$

So, the multiples of 3 and 5 less than 100 are 15, 30, 45, 60, 75, 90.

(ii) 2, 3, 5

$$30 = 2 \times 3 \times 5$$
$$60 = 2 \times 2 \times 3 \times 5$$
$$90 = 2 \times 3 \times 3 \times 5$$

So, the multiples of 2, 3, 5 less than 100 are 30, 60, 90

5. Match the columns :

(a) (iii) **(b)** (i) **(c)** (iv) (d) (ii)

Exercise-3

1. Prime numbers = 23, 29, 31, 37, 41, 43, 47, 53, 59.
Composite numbers = 21, 22, 24, 25, 26, 27, 28, 30, 32, 33, 34, 35, 36, 38, 39, 40, 42, 44, 45, 46, 48, 49, 50, 51, 52, 54, 55, 56, 57, 58.

2. The pair of prime numbers that differ by 5 are twin primes = (3, 5), (5, 7), (11, 13), (17, 19) and (29, 31).

3. No, every odd number is not a prime number. The smallest odd prime number is 3.

4. The numbers are said to be co-prime if, they do not have a common factor other than 1.
Or Two numbers are said to be co-prime if they do not have a common factor other than 1.
Examples : (2, 3), (1, 5)

5. 6

6. List all the prime numbers :

(i) The prime numbers less than 20
2, 3, 5, 7, 11, 13, 17, 19

(ii) The prime numbers between 100 and 150
101, 103, 107, 109, 113, 127, 131, 137, 139, 149

7. Find which of following numbers are prime :

(i) $87 = 3 \times 29$ $\therefore$ 87 is a multiple of 3 and 29
Thus, it is not a prime number.

(ii) $63 = 7 \times 9$
$\therefore$ 63 is a multiple of 7 and 9
Thus, it is not a prime number.

(iii) $91 = 13 \times 7$

$\therefore$ 91 is a multiple of 13 and 7

Thus, it is not a prime number.

(iv) $89 = 1 \times 89$

89 can be divided by 1 and 89

Thus, 89 is a prime number.

8. Sum of three prime numbers of $37 = 29 + 5 + 3$

Sum of three prime numbers of $49 = 41 + 5 + 3$

9. Fill in the blanks :

(i) Prime No., Composite No. (ii) 2 (iii) 2 (iv) 4

10. Express each of the following numbers as sum of two odd primes :

(i) $26 = 3 + 23$ (ii) $58 = 5 + 53$ (iii) $72 = 5 + 67$

Exercise-4

1. Test the divisibility of :

(i) Sum of even place digits $= 9 + 8 + 6 + 5 = 28$

Sum of odd place digits $= 1 + 0 + 3 + 2 = 6$

Rule of divisibility by 11. = Sum of even place digits – Sum of odd place digits

$= 28 - 6 = 22$

which is divisible 11

$\therefore$ 19083625 is divisible by 11.

(ii) Check the divisibility of 10001001 by sum of its digits $= 1 + 0 + 0 + 0 + 1 + 0 + 0 + 1 = 3$

Sum is a multiple of 3, hence 10001001 is divisible by 3.

(iii) 10203574 is not divisible by 4 because last two digits 74 is not divisible by 4.

$$\begin{array}{r} 18 \\ 4\overline{)74} \\ 4 \\ \hline 34 \\ 32 \\ \hline 2 \end{array}$$

(iv) 12030624 by 8

$$\begin{array}{r} 78 \\ 8\overline{)624} \\ 56 \\ \hline 64 \\ 64 \\ \hline 0 \end{array}$$

12030624 is divisible by 8 as last three digits 624 is divisible by 8.

2. Write T for true and F for false for the following statements :

(i) False (ii) False (iii) True

3. Write the digit in the box so that the number so formed is divisible by 9.

(i) We know that a number is divisible by 9, if the sum of its digits is divisible by 9.

In the given number _____ 8726, we have $8 + 7 + 2 + 6 + = 23$, which is not divisible by 9, so required digit is 4 because $23 + 4 = 27$ is divisible by 9.

So required digit is 4 and required number is 48726.

(ii) We know that a number is divisible by 9, if the sum of its digits is divisible by 9.
In the given number 67112 _____ , we have $6+7+1+1+2=17$, which is not divisible by 9. So required digit is 1 because $17+1=18$ is divisible by 9.
So, required digit is 1 and required number is 6711212.

4. Write the digit in the box so that the number so formed is divisible by 11.\
We know that a number is divisible by 11, if the difference of sum of digits at even places and sum of digits at odd place is 0 or divisible by 11.

(i) 101 _____ 313

$0 =$ Sum of even places – sum of odd places

$0 = (x+1) - 8$

or $x = 7$

(ii) 12 _____ 72

0 Sum of even places – sum of odd places

$0 = (2+7) - (1+x+2)$

$0 = 9 - (3+x)$

$0 = 9 - 3 - x$

or $x = 6$

Exercise-5

1. Find the prime factorization of the following numbers :

(i) We can find factors of $48 = 2 \times (24)$

$= 2 \times (2 \times 12)$

$= 2 \times 2 \times 2 \times 2 \times 3$

$48 = 2 \times 2 \times 2 \times 2 \times 3$

(ii) We can find factors of $144 = 2 \times (72)$

$= 2 \times 2 \times (36)$

$= 2 \times 2 \times 2 \times (18)$

$= 2 \times 2 \times 2 \times 2 \times (9)$

$= 2 \times 2 \times 2 \times 2 \times 3 \times 3$

$144 = 2 \times 2 \times 2 \times 2 \times 3 \times 3$

(iii) We can find factors of $56 = 2 \times 28$

$= 2 \times 2 \times 14$

$= 2 \times 2 \times 2 \times 7$

$56 = 2 \times 2 \times 2 \times 7$

(iv) We can find factors of $252 = 2 \times 126$

$= 2 \times 2 \times 63$

$= 2 \times 2 \times 3 \times 21$

$= 2 \times 2 \times 3 \times 3 \times 7$

$252 = 2 \times 2 \times 3 \times 3 \times 7$

(v) We can find factors of $2145 = 3 \times 715$

$= 3 \times 5 \times 143$

$2145 = 3 \times 5 \times 11 \times 13$

(vi) We can find factors of $1024 = 2 \times 512$

$$= 2 \times 2 \times 252$$
$$= 2 \times 2 \times 2 \times 128$$
$$= 2 \times 2 \times 2 \times 2 \times 64$$
$$= 2 \times 2 \times 2 \times 2 \times 2 \times 32$$
$$= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 16$$
$$= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 8$$
$$= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 4$$
$$1024 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$$

2. Find the number whose prime factors are 2, 3, 3, 5, 7 from the following :

(i) 326

We obtain the prime factors of 326 by using the division method

2	326
163	163
	1

Clearly, prime factors of $326 = 2 \times 163$

So, 2, 3, 3, 5, 7 are not prime factors of 326.

(ii) 620

We obtain the prime factors of 620 by using the division method.

2	620
2	310
5	155
31	31
	1

Clearly, prime factors of $620 = 2 \times 2 \times 5 \times 31$

So, 2, 3, 3, 5, 7 are not prime factors of 620.

(iii) 230

we obtain the prime factors of 230 by using the division method.

2	230
5	115
23	23
	1

Clearly, prime factors of $230 = 2 \times 5 \times 23$

So, 2, 3, 3, 5, 7 are not prime factors of 230.

(iv) 630

We obtain the prime factors of 630 by using the division method.

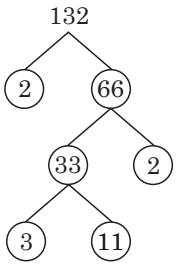
2	630
3	315
5	105
7	21
3	3
	1

Clearly, prime factors of $630 = 2 \times 3 \times 5 \times 7 \times 3$

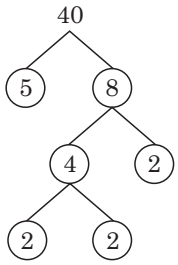
So, 2, 3, 5, 7 and 3 are prime factors of 630.

3. Complete the following :

(i) 132



(ii) 40



4. The greatest four digit number is 9999.

3	9999
3	3333
11	1111
101	101
	1

Thus, $9999 = 3 \times 3 \times 11 \times 101$

5. Three consecutive numbers = 8, 9 and 10 or 11, 12 and 13

Product of three consecutive numbers

$$= 8 \times 9 \times 10 = 720$$

which is divisible by 6.

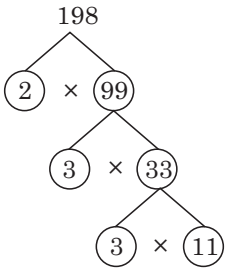
Product of three consecutive numbers

$$= 11 \times 12 \times 13 = 1716$$

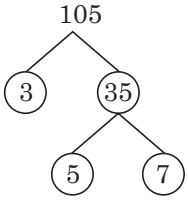
which is also divisible by 6.

6. Find the prime factors by factor tree method :

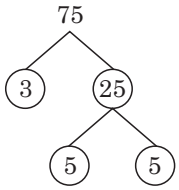
(i) 198



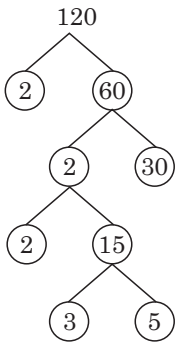
(ii) 105



(iii) 75



(iv) 120



Exercise-6

1. Determine the L.C.M. of the following :

(i) 24 and 92

By factorization method

2	24
2	12
2	6
3	3
	1

2	92
2	46
23	23
	1

$24 = 2 \times 2 \times 2 \times 3$

$92 = 2 \times 2 \times 23$

2 occurs maximum three times

3 occurs maximum one time

23 occurs maximum one time

$\therefore$ L.C.M. $= 2 \times 2 \times 2 \times 3 \times 23 = 552$

By short division method

2	24, 92
2	12, 46
2	6, 23
3	3, 23
23	1, 23
	1, 1

$\therefore$ L.C.M. $= 2 \times 2 \times 2 \times 3 \times 23 = 552$

(ii) 80, 85 and 90

By factorization method

2	80
2	40
2	20
2	10
5	5
	1

5	85
17	17
	1

3	90
3	30
5	10
2	2
	1

$80 = 2 \times 2 \times 2 \times 2 \times 5$

$85 = 5 \times 17$

$90 = 3 \times 3 \times 5 \times 2$

2 occurs maximum four time

5 occurs maximum one time

3 occurs maximum two time

17 occurs maximum one time

$\therefore$ L.C.M. $= 2 \times 2 \times 2 \times 2 \times 5 \times 3 \times 3 \times 17 = 12{,}240$

By short division method

2	80, 85, 90
5	40, 85, 45
2	8, 17, 9
2	4, 17, 9
2	2, 17, 9
3	1, 17, 9
3	1, 17, 3
17	1, 17, 1
	1, 1, 1

$\therefore$ L.C.M. $= 2\times2\times2\times2\times5\times3\times3\times17 = 12240$

(iii) 180, 77, 240

By factorization method

2	180
2	90
5	45
3	9
3	3
	1

7	77
11	11
	1

2	240
2	120
2	60
2	30
5	15
3	3
	1

$180 = 2\times2\times5\times3\times3$

$77 = 7\times11$

$240 = 2\times2\times2\times2\times5\times3$

2 occurs maximum four times

3 occurs maximum two times

5 occurs maximum one time

7 occurs maximum one time

11 occurs maximum one time.

$\therefore$ L.C.M. $= 2\times2\times2\times2\times5\times3\times3\times7\times11 = 55{,}440$

2	180, 77, 240
2	90, 77, 120
2	45, 77, 60
2	45, 77, 30
5	45, 77, 15
3	9, 77, 5
3	3, 77, 1
7	1, 77, 1
11	1, 11, 1
	1, 1, 1

L.C.M. $= 2\times2\times2\times2\times5\times3\times3\times7\times11 = 55440$

2. Find first three common multiples of :

(i) 5, 8

Multiples of 5 = 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 105, 110, 115, 120

Multiples of 8 = 8, 16, 24, 32, 40, 48, 56, 64, 72, 80, 88, 96, 104, 112, 120

Clearly, the first three common multiples of 5 and 8 = 40, 80, 120

(ii) 12, 15

Multiples of 12 = 12, 24, 36, 48, 60, 72, 84, 96, 108, 120, 132, 144, 156, 168, 180

Multiples of 15 = 15, 30, 45, 60, 75, 90, 105, 120, 135, 150, 165, 180

Clearly, the first three common multiples of 12 and 15 = 60, 120 and 180

(iii) 4, 12 and 16

Multiples of 4 = 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, 56, 60, 64, 68, 72, 76, 80, 84, 88, 92, 96, 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140, 144

Multiples of 12 = 12, 24, 36, 48, 60, 72, 84, 96, 108, 120, 132, 144

Multiples of 16 = 16, 32, 48, 64, 80, 96, 112, 128, 144, 160, 176, 192

Clearly, the first three common multiples of 4, 12 and 16 = 48, 96, 144

3. Find the L.C.M. of the following by prime factorization method :

(i) 56, 28, 36

By prime factorization

2	56
2	28
2	14
7	7
	1

2	28
2	14
7	7
	1

2	36
2	18
3	9
3	3
	1

$56 = 2 \times 2 \times 2 \times 7$

$28 = 2 \times 2 \times 7$

$36 = 2 \times 2 \times 3 \times 3$

2 occurs maximum three times

3 occurs maximum two times

7 occurs maximum one time

$\therefore$ L.C.M. $= 2 \times 2 \times 2 \times 3 \times 3 \times 7 = 504$

(ii) 90 and 32

2	90
5	45
3	9
3	3
	1

2	32
2	16
2	8
2	4
2	2
	1

$90 = 2 \times 5 \times 3 \times 3$

$32 = 2 \times 2 \times 2 \times 2 \times 2$

2 occurs maximum five times

3 occurs maximu two times

5 occurs maximum one time

$\therefore$ L.C.M. $= 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5 = 1440$

(iii) 240, 420, 660

2	240
2	120
2	60
2	30
5	15
3	3
	1

2	420
2	210
5	105
7	21
3	3
	1

2	660
2	330
5	165
3	33
11	11
	1

$240 = 2 \times 2 \times 2 \times 2 \times 5 \times 3$

$420 = 2 \times 2 \times 5 \times 7 \times 3$

$660 = 2 \times 2 \times 5 \times 3 \times 11$

2 occurs maximum four times

3 occurs maximum one time

5 occurs maximum one time

7 occurs maximum one time

11 occurs maximum one time

$\therefore$ L.C.M. $= 2 \times 2 \times 2 \times 2 \times 3 \times 5 \times 7 \times 11 = 18{,}480$

4. Determine the H.C.F. of the following by both prime factorization and long division methods :

(i) 84, 98

By prime factorization

2	84
2	42
7	21
3	3
	1

2	98
7	49
7	7
	1

We have $84 = 2 \times 2 \times 7 \times 3$

$84 = 2 \times 2 \times 7 \times 3$

$98 = 2 \times 7 \times 7$

Hence, H.C.F

By long division method

Dividend = 98, divisor = 84

$$84 \overline{)\,98\,(\,1} \quad 84$$

$$14 \overline{)\,84\,(\,6} \quad 84 \quad \times$$

Hence, H.C.F. of 84 and 98 is 14.

(ii) 70, 35, 49

By prime factorization

2	70
5	35
7	7
	1

7	35
5	5
	1

7	49
7	7
	1

We have $70 = 2 \times 5 \times \boxed{7}$

$35 = \boxed{7} \times 5$

$49 = \boxed{7} \times 7$

Hence, H.C.F. = 7

By long division method

Let us take two numbers 35 and 49.

$$\begin{array}{r|l} 35 & 49 \\ & 35 \\ \hline 14 & 35 \\ & 28 \\ \hline 7 & 14 \\ & 14 \\ \hline & \times \end{array} \quad \begin{array}{l} \big)\,\big(1 \\ \\ \big)\,\big(2 \\ \\ \big)\,\big(2 \\ \\ \\ \end{array}$$

The H.C.F. of 35 and 49 is 7.

Let us now find the H.C.F. of the third number 7 and 70

$$\begin{array}{r|l} 7 & 70 \\ & 70 \\ \hline & \times \end{array} \quad \begin{array}{l} \big)\,\big(10 \\ \\ \\ \end{array}$$

The H.C.F of 7 and 70 is 7.

Hence, the required H.C.F. of 35, 49 and 70 is 7.

(iii) 70, 105, 175

By factorization method

2	70
7	35
5	5
	1

5	105
7	21
3	3
	1

5	175
5	35
7	7
	1

We have $70 = 5 \times \boxed{7} \times 2$

$105 = 5 \times \boxed{7} \times 3$

$175 = 5 \times \boxed{7} \times 5$

Hence, H.C.F. $= 7 \times 5 = 35$

By long division method

Let us take two numbers 70 and 105

Dividend = 70, Divisor = 105

$$\begin{array}{r|l} 70 & 105 \\ & 70 \\ \hline 35 & 70 \\ & 70 \\ \hline & \times \end{array} \quad \begin{array}{l} \big)\,\big(1 \\ \\ \big)\,\big(2 \\ \\ \\ \end{array}$$

Hence, H.C.F. of 70 and 105 is 35. Let us how find the H.C.F. of third number 175 and 35

$$\begin{array}{r|l} 35 & 175 \\ & 175 \\ \hline & \times \end{array} \quad \begin{array}{l} \big)\,\big(5 \\ \\ \\ \end{array}$$

The H.C.F. of 35 and 175 is 35. Hence, the required H.C.F. of 70, 105 and 175 is 35.

(iv) 91, 112, 49

By factization method

13	91
7	7
	1

7	112
2	16
2	8
2	4
2	2
	1

7	49
7	7
	1

We have $91 = \boxed{7} \times 13$

$112 = \boxed{7} \times 2 \times 2 \times 2 \times 2$

$49 = \boxed{7} \times 7$

Hence, H.C.F. = 7

By long division method

Let us take two numbers 49 and 91

The H.C.F of 49 and 91 is 7.

Let us now find the H.C.F. of the third numbers 7 and 112

The H.C.f. of 7 and 112 is 7.

Hence, the required H.C.F. of 49, 91 and 112 is 7.

$49\overline{)91}\,(1$
$\underline{49}$
$42\overline{)49}\,(1$
$\underline{42}$
$7\overline{)42}\,(6$
$\underline{42}$
$\times$

$7\overline{)112}\,(16$
$\underline{112}$
$\times$

5. Two consecutive numbers are 2 and 3.

The H.C.F. of 2 and 3

Hence, the H.C.F. of two consecutive number is 1.

$2\overline{)3}\,(1$
$\underline{2}$
$1\overline{)2}\,(2$
$\underline{1}$
$\times$

6. H.C.F. of 10 and 21

The H.C.F. of 10 and 21 is 1

Hence, the H.C.F. of 10 and 21 is 1. It is not correct that the H.C.F. of 10 and 21 is 0.

$10\overline{)21}\,(2$
$\underline{20}$
$1\overline{)10}\,(10$
$\underline{10}$
$\times$

Exercise-7

1. The least number divisible by 35,50 and 70 is their L.C.M. So the required number is 9 more than their L.C.M.

L.C.M. of 35, 50 and 70

5	35,	50,	70
5	7,	10,	14
7	7,	2,	14
2	1,	2,	2
	1,	1,	1

L.C.M. $= 5 \times 5 \times 7 \times 2 = 350$

Thus, the required least number is $(350 + 9) = 359$

2. To find the times between two simultaneous flashes of all search lights, we will calculate L.C.M. of 4, 6, and 9

2	4,	6,	9
2	2,	3,	9
3	1,	3,	9
3	1,	1,	3
	1,	1,	1

Therefore, L.C.M. $= 2 \times 2 \times 3 \times 3 = 36$

So, the times between two simultaneous flashes of all search lights are 36 seconds.

3. L.C.M. of 8, 10 and 12

2	8,	10,	12
2	4,	5,	6
2	2,	5,	3
5	1,	5,	3
3	1,	1,	3
	1,	1,	1

$2 \times 2 \times 2 \times 5 \times 3 = 120$

It can be seen that $120 \times 8 = 960$ and $120 \times 9 = 1080$.

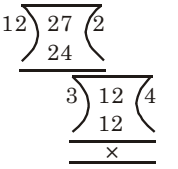
Hence, the greatest 3-digit number exactly divisible by 8, 10 and 12 is 960.

6. The greatest number of packets is the H.C.F. of 18, 27 and 12.

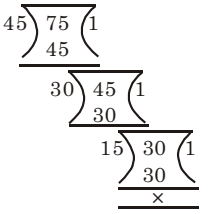
$\therefore$ The greatest number of packets is 3.

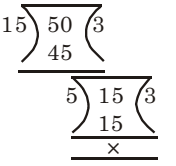
$$\text{Pens} = \frac{18}{3} = 6 \text{ ; Markers} = \frac{27}{3} = 9$$

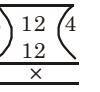
$$\text{Pencils} = \frac{12}{3} = 4$$



7. The required maximum length of a rope is the H.C.F. of 45, 50 and 75







$\therefore$ The maximum length of the rope is 5 cm.

8. Product of two numbers = 9072

$$\text{H.C.F.} = 18$$

$$\text{L.C.M.} \times \text{H.C.F.} = \text{Product of two numbers}$$

$$\text{L.C.M.} = \frac{9072}{18} = 504$$

9. L.C.M. = 180

H.C.F. = 6

One of the numbers = 30

Let other number = x

L.C.M. × H.C.F. = Product of two numbers

$$x = \frac{180 \times 6}{30} = 6 \times 6 = 36$$

Other number is 36.

Chapter-3 Whole Number

Exercise-1

1. 1 is the smallest natural number.

2. The predecessor of largest 2-digit number is 98.

3. The next four whole numbers after 1001 are 1002, 1003, 1004 and 1005.

4. **Write the successor of :**

(i) The successor of 10009 is
$10009 + 1 = 10010$

(ii) The successor of 999 is
$1999 + 1 = 1000$

(iii) The successor of 2013 is
$2013 + 1 = 2014$

5. **Write the predecessor of :**

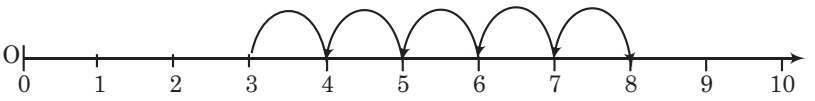
(i) The predecessor of 10000 is
$10000 - 1 = 9999$

(ii) The predecessor of 304090 is
$304090 - 1 = 304089$

(iii) The predecessor of 4654321 is
$4654321 - 1 = 4654320$

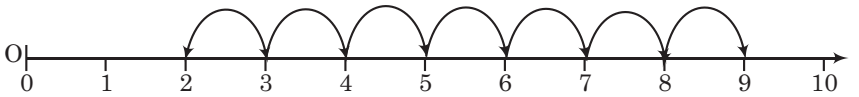
6. **Represent the following on the number line :**

(i) $3 + 5$



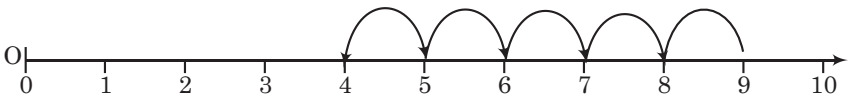
$\therefore \quad 3 + 5 = 8$

(ii) $2 + 7$



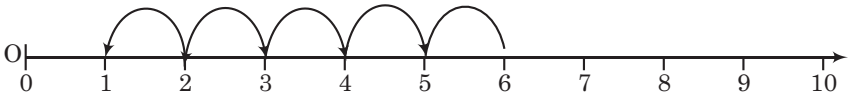
$\therefore 2 + 7 = 9$

(iii) $9 - 5$



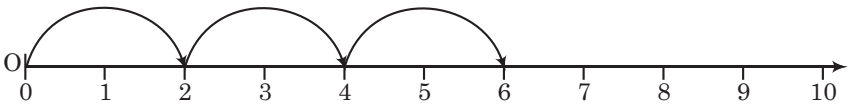
$\therefore \quad 9 - 5 = 4$

(iv) $6 - 5$



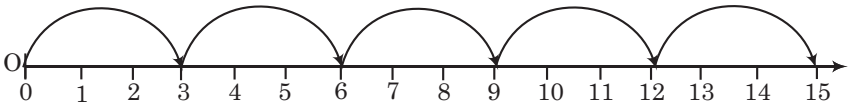
$\therefore \quad 6 - 5 = 1$

(v) 3×2



$\therefore \quad 3 \times 2 = 6$

(vi) 3×5



$\therefore \quad 3 \times 5 = 15$

7. Which of the following statements are true :

(i) False **(ii)** True **(iii)** False **(iv)** True **(v)** True

Exercise-2

1. Fill in the blanks :

(i) $47 + 953 = \boxed{953} + 47$

(ii) $\boxed{2008} + 1952 = 1952 + 2008$

(iii) $300507 + 0 = \boxed{300507}$

(iv) $(47 + 953) + 120 = (953 + 120) + 47$

2. Find the sum by suitable rearrangements :

(i) $2062 + 353 + 1438 + 547$

$= (353 + 547) + 2062 + 1438$

$= 900 + 2062 + 1438$

$= (2062 + 1438) + 900$

$= 3500 + 900$

$= 4400$

(ii) $43 + 159 + 267 + 38 + 31$

$= (159 + 31) + (43 + 267) + 38$

$= 190 + 310 + 38$

$= (190 + 310) + 38$

$= 500 + 38$

$= 538$

(iii) $19 + 18 + 17 + 1 + 2 + 3 + 4$

$= (19 + 1) + (18 + 2) + (17 + 3) + 4$

$= 20 + 20 + 20 + 4$

$= (20 + 20) + 20 + 4$

$= (40 + 20) + 4$

$= 60 + 4$

$= 64$

(iv) $853 + 907 + 947$

$= (853 + 907) + 947$

$= 1760 + 947$

$= 2707$

3. Greatest 3-digit number = 999

Least 4-digit number = 1000

Sum of the numbers = $999 + 1000$

$= 1999$

Check by the reversing the order of addends

$= 1000 + 999 = 1999$

4. Perform the following subtraction and check your results by corresponding addition :

(i) $4839 - 988$

$4839 - 988 = 3851$

Check : 3 8 5 1
+ 9 8 8
4 8 3 9

(ii) 100000 – 48763

100000 – 48763 = 51237

Check : 5 1 2 3 7
+ 4 8 7 6 3
1, 0 0, 0 0 0

(iii) 42304 – 10999

42304 – 10999 = 31305

Check : 3 1 3 0 5
+ 1 0 9 9 9
4 2 3 0 4

(iv) 3030301 – 787878

3030301 – 787878 = 2242423

Check : 2 2 4 2 4 2 3
+ 7 8 7 8 7 8
3 0 3 0 3 0 7

5. Replace * by the correct digit :

(i) 6 1 7 2
– ③② 6 9
2 9 ⓪③

(ii) 1 0 0 0 0 0
– ④⑧⑦ 6 5
5 1 2 ③⑤

(iii) 8 5 9
– 2 ⑥⑤
⑤ 9 4

6. Largest 4 digit number = 9999

Smallest 5 digit number = 10000

= 10000 – 9999 = 1

Hence, we must added to 1

7. Saurav had money = ₹ 81000

Saurav gave to Nirmal = ₹ 18750

Saurav gave to Payal = ₹ 22638

Saurav gave to Neelam = ₹ 35000

Money left with Saurav = ₹ 81000 – ₹ 18750 – ₹ 22638 – ₹ 35000

= ₹ (81000 – 76388)

= ₹ 4612

Hence, saurav have left money = ₹ 4612

8. Original number = 36490

Interchanged number = 39460

Difference between the new number and original number

= New number – Original number

= 39460 – 36490 = 2970

Exercise-3

1. Write the missing number :

(i) $2 \times 63 = \boxed{63} \times 2$

(ii) $867 \times \boxed{1} = 867$

(iii) $430 \times 0 = \boxed{0}$ (iv) $(763) \times 5 \times 6 = 763 \times 6 \times \boxed{5}$

(v) $1275 \div 1 = \boxed{1275}$ (iv) $0 \div 643 = \boxed{0}$

2. Find the product by suitable arrangement :

(i) $5 \times 87 \times 20$

$= (5 \times 20) \times 87$

$= 100 \times 87$

$= 8700$

(ii) $285 \times 5 \times 60$

$= (5 \times 60) \times 285$

$= 300 \times 285$

$= 85500$

(iii) $8 \times 291 \times 125$

$= (8 \times 125) \times 291$

$= 1000 \times 291$

$= 291000$

(iv) $16 \times 80 \times 25 \times 1523$

$= (80 \times 25) \times 16 \times 1523$

$= 200 \times 16 \times 1523$

$= 32000 \times 1523$

$= 48736000$

3. Simplify the following using properties of multiplication :

(i) 1020×35

$= 1020 \times 35 = 35700$

(ii) $45625 \times 15625 - 45625 \times 5625$

$= 45625\ (15625 - 5625)$

$= 45625 \times 10000$

$= 456250000$

(iii) $887 \times 10 \times 461 - 361 \times 8870$

$= (887 \times 10) \times 461 - 361 \times 8870$

$= 8870 \times 461 - 361 \times 8870$

$= 8870\ (461 - 361)$

$= 8870 \times 100$

$= 88700$

(iv) $1008 \times 8 + 1008 \times 92$

$= 1008\ (8 + 92)$

$= 1008 \times 100$

$= 100800$

(v) $3845 \times 999 + 3845$

$= 3845 \times (999 + 1)$

$= 3845 \times 1000$

$= 3845000$

4. No.

5. Aarushi has 20 coins of ₹1

$= 20 \times 1 = ₹\ 20$

She have 20 coins of ₹ 5in her piggy bank

$= 20 \times 5 = ₹100$

Total money Aarushi has = ₹ (100 + 20) = ₹120

She does not have enough money in her piggy bank to buy a doll because she has only ₹120 and she want to ₹160.

6. Find the value :

(i) $4876 \div 1$

$= 4876 \div 1 = 4876$

(ii) $0 \div 1234$

$0 \div 1234 = 0$

(iii) $2476 + (940 \div 94)$

$= 2476 + (10)$

$= 2476 + 10$

$= 2486$

(iv) $(1263 \div 1263) - (453 \div 453)$

$= 1 - 1$

$= 0$

(v) $72450 \div (583 - 58)$

$= 72450 \div 525$

$= 138$

7. Divide and find Quotient and remainder and check the result by division algorithm :

(i) $69834 \div 343$

Quotient = 203

Remainder = 205

Divisor = 343

Dividend = 69834

$343\overline{)69834}(203$

6860

1234

1029

205

Check : $d \times q + r = D$

$343 \times 203 + 205 = 69834$

$69629 + 205 = 69834$

$69834 = 69834$

L.H.S. = R.H.S.

(ii) $724957 \div 36$

Quotient = 20137, Remainder = 25,

Devisor = 36, Dividend = 724957

$36\overline{)724957}(20137$

72

49

16

1355

1088

277

252

25

Check : $d \times q + r = D$

$36 \times 20137 + 25 = 724957$

$724932 + 25 = 724957$

$724957 = 724957$

L.H.S. = R.H.S.

(iii) $867350 \div 627$

Quotient = 1383

Remainder = 209

Divisor = 627

Dividend = 867350

Check : $d \times q + r = D$

$= 627 \times 1383 + 209 = 867350$

$867141 + 209 = 867350$

$867350 = 867350$

L.H.S. = R.H.S.

$627\overline{)867350}(1383$

627

2403

1881

5225

5016

2090

1881

209

(iv) $401655 \div 450$

Quotient = 892

Remainder = 255

Divisor = 450

Dividend = 401655

Check : $d \times q + r = D$

$450 \times 892 + 255 = 401655$

$401400 + 255 = 401655$

$401655 = 401655$

L.H.S. = R.H.S.

$450\overline{)401655}(892$

3600

4165

4050

1155

900

255

8. Let the two numbers be a and b.

Product of two numbers = 2417856

One of the numbers = $a = 3598$

To find the other numbers = b (say)

$a \times b = 2417856$

$3598 \times b = 2417856$

$b = 2417856 \div 3598$

$b = 672$

Hence, the other number is 672.

Exercise-4

1. Observe the following pattern and supply the missing number :

(1) If, $11 \times 11 = 121$

$101 \times 101 = 10201$

$10101 \times 10101 = 102030201$

Then, $1010101 \times 1010101 = 10203040201$

$101010101 \times 101010101 = 10203040504030201$

(2) If, $9 \times 0 + 1 = 1$

$9 \times 1 + 2 = 11$

$9 \times 2 + 3 = 21$

$9 \times 5 + 6 = 51$

$9 \times 8 + 9 = 81$

(3) If, $10 \times 0 + 1 = 1$

$10 \times 1 + 1 = 11$

$10 \times 2 + 1 = 21$

$10 \times 3 + 1 = 31$

$10 \times 9 + 1 = 91$

(4) If $16 \div 8 = 2$

$160 \div 8 = 20$

$16000 \div 8 = 2000$

(5) If, $9 \times 9 + 7 = 88$

$98 \times 9 + 6 = 888$

$987 \times 9 + 5 = 8888$

$9876 \times 9 + 4 = 88888$

Chapter-4 : Negative Number and Integers

Exercise-1

1. Write the opposites of :

(a) Withdrawing ₹ 2000 from a bank account.

(b) Increase of 10 marks.

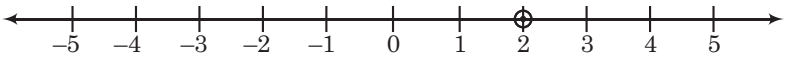
(c) Spending ₹ 500..

(d) Going 3 km towards west.

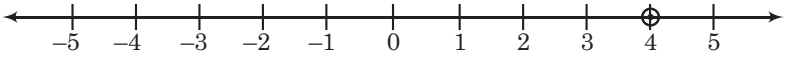
(e) Gaining weight of 7 kg.

2. Represent the following numbers on a number line :

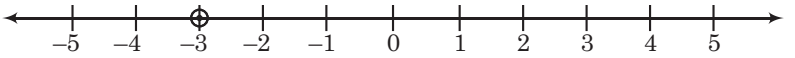
(a) 2



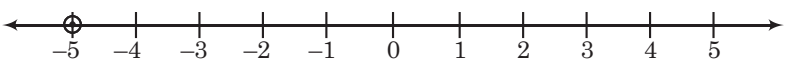
(b) 4



(c) – 3



(d) – 5



3. Write all the integers between :

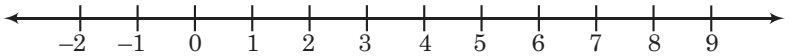
(a) Between –7 and 4 : –6, – 5, – 4, – 3, – 2, – 1, 0, 1, 2, 3

(b) Between –10 and 6 : –9, – 8, – 7, – 6, – 5, – 4, – 3, – 2, – 1, 0, 1, 2, 3, 4, 5

(c) Between –6 and –1 : –5, – 4, – 3, – 2

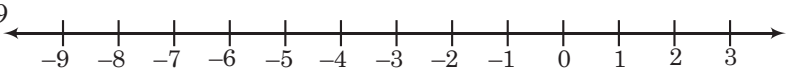
4. Which number in each of the following pairs is to the left of the order on the number line?

(a) 6, 9



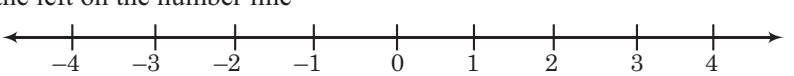
6 is to the left on the number line

(b) –5, –9



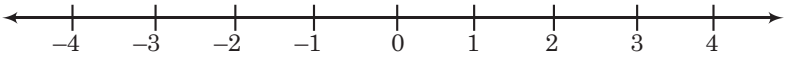
– 9 is to the left on the number line

(c) 0, 6



0 is to the left on the number line

(d) 3, –1



–1 is left on a number line

5. Compare the following pairs of numbers using > or < :

(a) < (b) < (c) > (d) > (e) >

6. Write the successor and predecessor of the following :

(a) The successor of – 13 is

$$-13+1=-12$$

The predecessor of –13 is

$$-13-1=-14$$

(b) The successor of 0 is

$$0+1=1$$

The predecessor of 0 is

$$0-1=-1$$

(c) The successor of –2 is

$$-2+1=-1$$

The predecessor of –2 is

$$-2-1=-3$$

(d) The successor of –7 is

$$-7+1=-6$$

The predecessor of –7 is

$$-7-1=-8$$

(e) The successor of –40 is

$$-40+1=-39$$

The predecessor of –40 is

$$-40-1=-41$$

7. Arrange the following integers in ascending order :

(a) –84, – 48, – 45, – 33, – 30 (b) –501, – 105, – 100, – 94, – 61

8. Arrange the following integers in descending order :

(a) 9, 4, 0, – 4, – 6, – 9 (b) –157, – 175, – 517, – 715, – 751

9. Write five negative integers :

(a) Greater than –22

–21, – 20, – 19, – 18, – 17

(b) Less than –32

–33, – 34, – 35, – 36, – 37

(c) Greater than –15

–14, – 13, – 12, – 11, – 10

(d) Less than –70

–71, – 72, – 73, – 74, – 75

10. Find the absolute value of :

(a) The absolute value of $-5 = |-5|$

$= 5$

(b) The absolute value of $9 = |9|$
$= 9$

(c) The absolute value of $-14 = |-14|$
$= 14$

(d) The absolute value of $26 = |26|$
$= 26$

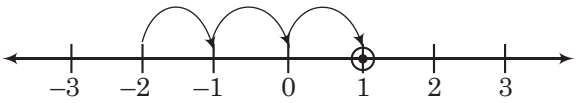
Exercise-2

1. Using the number line, write integer which is :

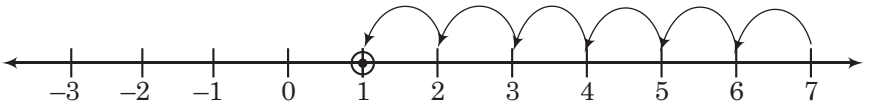
(a) 3 more than – 2

$3 + (-2)$

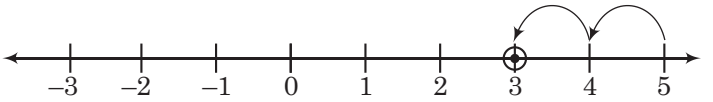
Starting at –2, towards right.



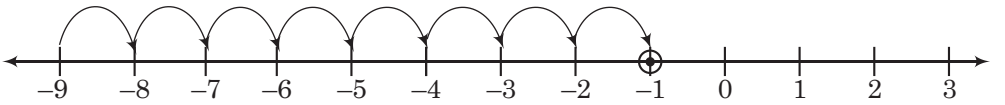
(b) 6 less than 7



(c) 5 less than 2



(d) 8 more than –9



2. Fill in the blanks :

(a) –12 (b) –17 (c) 12 (d) –3

3. Write inverse of :

(a) Inverse of +14 is –14.

(b) Inverse of –19 is 19.

(c) Inverse of –26 is 26.

(d) Inverse of 273 is –273.

(e) Inverse of –99 is 99.

4. Add the following integers :

(a) $-13, 18$
$= -13 + 18$
$= 5$

(b) $-45, 24$
$= -45 + 24$
$= -21$

(c) $-500, -680$
$= (-500) + (-680)$
$= -1180$

(d) $-40, -190, 320$
$= (-40) + (-190) + 320$
$= (-230) + 320$
$= 90$

5. Simplify the following :

(a) $54 + (-3) + (-66) + 17$
$= 54 + 17 + (-3) + (-66)$
$= 54 + 17 + (-69)$
$= 71 + (-69)$
$= 2$

(b) $-8 + (-9) + 7 + 18$
$= -17 + 25$
$= 8$

(c) $30 + (-43) + (-63) + 55$
$= 30 + 55 + (-43) + (-63)$
$= 30 + 55 + (-106)$
$= 85 + (-106)$
$= -21$

(d) $-90 + (-100) - (-62)$
$= -90 + (-100) - (-62)$
$= -190 - (-62)$
$= -190 + 62$
$= -128$

6. Sum of two integers = –49
One of the integers = 35 = a (say)
Let other integer = b

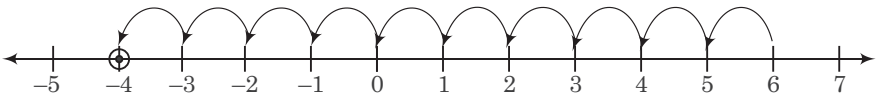
$$a + b = -49$$
$$35 + b = -49$$
$$b = -49 - 35$$
$$b = -84$$

7. Given : the temperature in Srinagar in the morning = 4°C
Temperature dropped = 7°C
To find the temperature of Srinagar at night = ?
The temperature of Srinagar at night = $4 - 7 = -3$°C

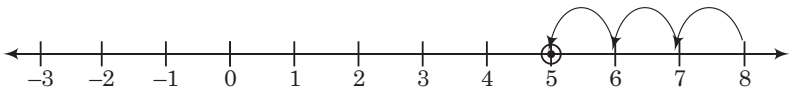
Exercise-3

1. Find the difference, using number line :

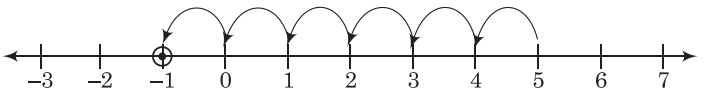
(a) 6 – 10



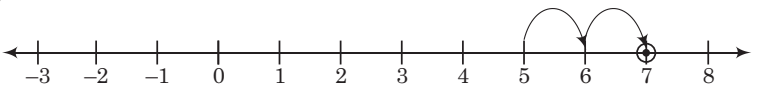
(b) 8 – 3



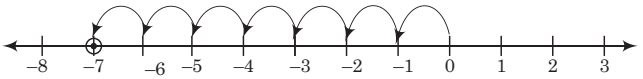
(c) 5 – 6



(d) 5– (–2)



(e) 0 – 7



2. Subract the first integer from the second integer :

(a) –16, –15
= –15 – (–16)
= –15 + 16
= 1

(b) –451, – 286
= – 286 – (–451)
= – 286 + 451
= 165

(c) 5123, – 2154
= 2154 – 5123
= – 7277

(d) – 500, 450
= 450 – (–500)
= 450 + 500
= 950

3. Subtract :

(a) 25 from –50
= – 50 – 25
= – 75

(b) –70 from –70
= – 70 – (–70)
= – 70 + 70
= 0

(c) –315 from 360
= 360 – (–315)
= 360 + 315
= 675

(d) 0 from (–70)
= – 70 – 0
= – 70

(e) –85 from 0
= 0 – (–85)
= 0 + 85
= 85

4. Simplify :

(a) –10 – 5 – (–35)
= –10 – 5 + 35
= –15 + 35
= 20

(b) 100 – (–100) – (–100)
= 100 + 100 + 100
= 300

(c) –26 + (–13) + (–52)
= – 26 + (–13) + (–52)
= – 26 + (–65)
= – 26 – 65
= – 91

(d) –13 + (–17) – (–22) – (–40)
= –13 + (–17) – (–62)
= – 30 + 62
= 32

(e) 84 + (–99) + 33 – (–28) – 43
= 84 + 33 + (–99) – (–28) – 43
= 84 + 33 + (–71) – 43
= 84 + 33 – 71 – 43
= 84 + 33 – 14
= 117 – 114 = 3

5. Subtract –15 from 4
= 4 – (–15) = 4 + 15 = 19

Subtract 4 from -15

$= -15 - 4 = -19$

Hence, the two results are not the same.

6. The sum of two integers $= -41 = a + b$

One of the integer is $= -29 = a$

To find Find the other integer $= b$

$$a + b = -41$$
$$-29 + b = -41$$
$$b = -41 + 29$$
$$b = -12$$

Hence, the other integer is -12.

7. The sum of 4 and -44

$$= 4 + (-44)$$
$$= -40$$

Subtract -4 from -40

$$= -40 - (-4)$$
$$= -40 + 4$$
$$= -36$$

8. A submarine was situated below the sea level = 700 m

It ascends = 250 m

To find its new position.

Its new position = $(700 - 250)$ m

$= 450$ m

Hence, now the submarine is situated 450 m below the sea level.

Chapter-5 : Fractions

Exercise-1

1. Write the numerator and denominator of each of the following fractions :

(a) $\frac{7}{5}$

Numerator = 7, Denominator = 15

(b) $\frac{9}{18}$

Numerator = 9, Denominator = 18

(c) $\frac{15}{30}$

Numerator = 15, Denominator = 30

(d) $\frac{13}{27}$

Numerator = 13, Denominator = 27

(e) $\frac{16}{32}$

Numerator = 16, Denominator = 32

2. Write the fraction for each of the following :

(a) Three-sevenths = $\frac{3}{7}$

(b) Nine-fifths = $\frac{9}{5}$

(c) Five-elevenths = $\frac{5}{11}$

(d) Four-eights = $\frac{4}{8}$

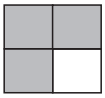
(e) Thirteen-hundredths = $\frac{13}{100}$

3. Write the fractions representing the shaded parts in the following figures :

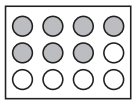
(a) $\frac{1}{4}$ (b) $\frac{1}{2}$ (c) $\frac{3}{4}$ (d) $\frac{3}{8}$ (e) $\frac{5}{9}$

4. Shade the part according to the given fractions :

(a) $\frac{2}{3}$ 

(b) $\frac{3}{4}$ 

(c) $\frac{1}{4}$ 

(d) $\frac{3}{8}$ 

5. Write down the fractional number for each of the following :

(a) $\frac{3}{4}$ = Three-fourths

(b) $\frac{4}{7}$ = Four-sevenths

(c) $\frac{1}{8}$ = One-eighth

(d) $\frac{7}{12}$ = Seven-twelfths

(e) $\frac{8}{9}$ = eight-nineths

6. $\frac{1}{4}$ **7.** Three

8. Arya has to read a book containing = 125 pages

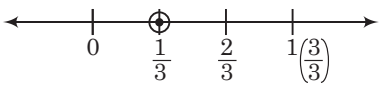
He has read = 75 pages

Fraction of book he has read = $\frac{\text{Pages read by him}}{\text{Total pages in the book}}$

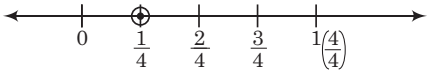
$= \frac{75 \text{ pages}}{125 \text{ pages}} = \frac{75}{125} = \frac{3}{5}$

9. Represent the following fractions on a number line :

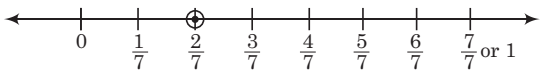
(a) $\frac{1}{3}$



(b) $\frac{3}{4}$



(c) $\frac{2}{7}$



Exercise-2

1. Identify which of the following are proper and which are improper fractions :

(a) $\frac{4}{7}$ = Proper fraction (b) $\frac{3}{2}$ = Improper fraction

(c) $\frac{11}{5}$ = Improper fraction (d) $\frac{23}{3}$ = Improper fraction

2. Change the following improper fractions into mixed fractions :

(a) $\frac{23}{7}$

First divide 23 by 7.

$$7\overline{)\,23\,(3}$$
$$\underline{21}$$
$$2$$

$\therefore$ Mixed number = Quotient $\frac{\text{Remainder}}{\text{Divisor}}$

$$= Q\frac{R}{D} = 3\frac{2}{7}$$

(b) $\frac{25}{9}$

First divide 25 by 9.

$$9\overline{)\,25\,(2}$$
$$\underline{18}$$
$$7$$

$\therefore$ Mixed number = Quotient $\frac{\text{Remainder}}{\text{Divisor}}$

$$= Q\frac{R}{D} = 2\frac{7}{9}$$

(c) $\frac{82}{11}$

First divide 82 by 11.

$$11\overline{)\,82\,(7}$$
$$\underline{77}$$
$$5$$

$\therefore$ Mixed number = Quotient $\frac{\text{Remainder}}{\text{Divisor}} = 7\frac{5}{11}$

(d) $\frac{53}{16}$

First divide 53 by 16.

$$16\overline{)\,53\,(3}$$
$$\underline{48}$$
$$5$$

Mixed number = Quotient $\frac{\text{Remainder}}{\text{Divisor}} = 3\frac{5}{16}$

3. Change the following mixed fractions into improper fractions :

(a) $2\frac{1}{13}$

$$Q\frac{R}{D} = \frac{Q \times D + R}{D}$$

$$2 + \frac{1}{3} = \frac{2 \times 13 + 1}{13}$$

$$= \frac{26+1}{13} = \frac{27}{13}$$

(b) $7\frac{3}{8}$

$$Q\frac{R}{D}=\frac{Q\times D+R}{D}$$

$$7+\frac{3}{8}=\frac{7\times 8+3}{8}$$

$$=\frac{56+3}{8}=\frac{59}{8}$$

(c) $11\frac{1}{4}$

$$Q\frac{R}{D}=\frac{Q\times D+R}{D}$$

$$11+\frac{1}{4}=\frac{11\times 4+1}{4}$$

$$=\frac{44+1}{4}=\frac{45}{4}$$

(d) $2\frac{1}{2}$

$$Q\frac{R}{D}=\frac{Q\times D+R}{D}$$

$$2+\frac{1}{2}=\frac{2\times 2+1}{2}$$

$$=\frac{4+1}{2}=\frac{5}{2}$$

4. Reduce the following to simplest form :

(a) $\frac{126}{90}$

Divide numerator and denominator by the first common factor. Repeat till numerator and denominator become co-primes, as

$$\frac{126}{90}=\frac{126\div 3}{90\div 3}=\frac{42}{30}$$

$$=\frac{42\div 3}{30\div 3}=\frac{14}{10}$$

$$=\frac{14\div 2}{10\div 2}=\frac{7}{5}$$

$\therefore$ $\frac{7}{5}$ is the lowest form of $\frac{126}{90}$.

(b) $\frac{48}{60}$

Divide numerator and denominator by the first common factor. Repeat till numerator and denominator become co-primes, as

$$\frac{48}{60} = \frac{48 \div 2}{60 \div 2} = \frac{24}{30}$$
$$= \frac{24 \div 3}{30 \div 3} = \frac{8}{10}$$
$$= \frac{8 \div 2}{10 \div 2} = \frac{4}{5}$$

Hence, lowest form of $\frac{48}{60}$ is $\frac{4}{5}$.

(c) $\frac{68}{17}$

Divide numerator and denominator by the first common factor. Repeat till numerator and denominator become co-primes, as

$$\frac{68}{17} = \frac{68 \div 17}{17 \div 17} = \frac{4}{1} = 4$$

(d) $\frac{84}{98}$

Divide numerator and denominator by the first common factor. Repeat till numerator and denominator become co-primes, as

$$\frac{84}{98} = \frac{84 \div 2}{98 \div 2} = \frac{42}{49}$$
$$= \frac{42 \div 7}{49 \div 7} = \frac{6}{7}$$

(e) $\frac{162}{108}$

Divide numerator and denominator by the first common factor. Repeat till numerator and denominator become co-primes, as

$$\frac{162}{108} = \frac{162 \div 2}{108 \div 2} = \frac{81}{54}$$
$$= \frac{81 \div 9}{54 \div 9} = \frac{9}{6}$$
$$= \frac{9 \div 3}{6 \div 3} = \frac{3}{2}$$

(f) $\frac{24}{33}$

Divide numerator and denominator by the first common factor. Repeat till numerator and denominator become co-primes, as

$$\frac{24}{33} = \frac{24 \div 3}{33 \div 3} = \frac{8}{11}$$

5. Identify which of the following are unit fractions :

(b) $\frac{1}{6}$ and (d) $\frac{1}{15}$ are unit fractions

Exercise-3

1. Write three equivalent fractions for each of the following :

(a) $\frac{3}{6}$

$$\frac{3}{6}=\frac{3\times2}{6\times2}=\frac{3\times3}{6\times3}=\frac{3\times4}{6\times4}$$

$$\frac{3}{6}=\frac{6}{12}=\frac{9}{18}=\frac{12}{24}$$

(b) $\frac{7}{9}$

$$\frac{7}{9}=\frac{7\times2}{9\times2}=\frac{7\times3}{9\times3}=\frac{7\times4}{9\times4}$$

$$\frac{7}{9}=\frac{14}{18}=\frac{21}{27}=\frac{28}{36}$$

(c) $\frac{9}{10}$

$$\frac{9}{10}=\frac{9\times2}{10\times2}=\frac{9\times3}{10\times3}=\frac{9\times4}{10\times4}$$

$$\frac{9}{10}=\frac{18}{20}=\frac{27}{30}=\frac{36}{40}$$

(d) $\frac{12}{15}$

$$\frac{12}{15}=\frac{12\times2}{15\times2}=\frac{12\times3}{15\times3}=\frac{12\times4}{15\times4}$$

$$\frac{12}{15}=\frac{24}{30}=\frac{36}{45}=\frac{48}{60}$$

2. Write the equivalent fraction of $\frac{4}{7}$ with :

(a) Numerator 28

$$\frac{4}{7}=\frac{28}{\square}$$

To get 28 as numerator, we multiply 4 by 7, so we multiple numerator and denominator by 7.

$$\frac{4}{7}=\frac{4\times7}{7\times7}=\frac{28}{49}$$

$\therefore$ Equivalent fraction of $\frac{4}{7}=\frac{28}{49}$

(b) Denominator 77

$$\frac{4}{7}=\frac{\square}{77}$$

To get 77 as denominator, we multiply 7 by 11, so we multiply numerator and denominator by 11

$$\frac{4}{7}=\frac{4\times11}{7\times11}=\frac{44}{77}$$

$\therefore$ Equivalent fraction of $\frac{4}{7}=\frac{44}{77}$

(c) Denominator 84

$$\frac{4}{7}=\frac{\square}{84}$$

To get 84 as denominator, we multiply 7 by 12, so we multiply numerator and denominator by 12

$$\frac{4}{7}=\frac{4\times12}{7\times12}=\frac{48}{84}$$

$\therefore$ Equivalent fraction of $\frac{4}{7}=\frac{48}{84}$

(d) Numerator 80

$$\frac{4}{7}=\frac{80}{\square}$$

To get 80 as numerator, we multiply 4 by 20, so we multiply numerator and denominator by 20.

$$\frac{4}{7}=\frac{4\times20}{7\times20}=\frac{80}{140}$$

$\therefore$ Equivalent fraction of $\frac{4}{7}=\frac{80}{140}$

3. Find the equivalent fractions of $\frac{54}{72}$ with :

(a) Numerator 6

$$\frac{54}{72}=\frac{6}{\square}$$

To get 6 in numerator, we divide 54 by 9, so we divide numerator and denominator by 9.

$$\frac{54}{72}=\frac{54\div9}{72\div9}=\frac{6}{8}$$

$\therefore$ Equivalent fraction of $\frac{54}{72}=\frac{6}{8}$

(b) Denominator 4

$$\frac{54}{72}=\frac{\square}{4}$$

To get 4 in denominator, we divide 72 by 18, so we divide numerator and denominator by 18.

$$\frac{54}{72}=\frac{54\div18}{72\div18}=\frac{3}{4}$$

$\therefore$ Equivalent fraction of $\frac{54}{72}=\frac{3}{4}$

4. Fill in the blanks :

(a) $$\frac{8}{5}=\frac{\square}{30}$$

$$\frac{8}{5}=\frac{8\times 6}{5\times 6}=\frac{\boxed{48}}{30}$$

(b) $\frac{\square}{20}=\frac{9}{60}$

$$\frac{\square}{20}=\frac{9\div 3}{60\div 3}=\frac{\boxed{3}}{20}$$

(c) $\frac{10}{11}=\frac{50}{\square}$

$$\frac{10}{11}=\frac{10\times 5}{11\times 5}=\frac{50}{\boxed{55}}$$

(d) $\frac{8}{\square}=\frac{56}{77}$

$$\frac{8}{\square}=\frac{56\div 7}{77\div 7}=\frac{8}{\boxed{11}}$$

(e) $\frac{6}{7}=\frac{\square}{49}$

$$\frac{6}{7}=\frac{6\times 7}{7\times 7}=\frac{\boxed{42}}{49}$$

5. Check, whether the given fractions are equivalent or not :

(a) $\frac{15}{20}$ and $\frac{3}{5}$

$\frac{15}{20}$ $\times$ $\frac{3}{5}$

$75 \neq 60$ Not equivalent

The cross products are not equal, so the fractions are not equivalent.

(b) $\frac{3}{5}$ and $\frac{9}{15}$

$\frac{3}{5}$ $\times$ $\frac{9}{15}$

$45 = 45$

Since the cross products are equal, the fractions are equivalent.

(c) $\frac{6}{9}$ and $\frac{3}{2}$

$\frac{6}{9}$ $\times$ $\frac{3}{2}$

$12 \neq 27$

The cross products are not equal, so the fractions are not equivalent.

(d) $\frac{3}{7}$ and $\frac{9}{5}$

$\frac{3}{7}$ $\times$ $\frac{9}{5}$

$15 \neq 63$

The cross products are not equal, so the fractions are not equivalent.

(e) $\frac{15}{3}$ and $\frac{20}{4}$

$\frac{15}{3} \times \frac{20}{4}$

$60 = 60$

Since the cross products are equal, so the fractions are equivalent.

(f) $\frac{15}{19}$ and $\frac{20}{11}$

$\frac{15}{19} \times \frac{20}{11}$

$165 \neq 380$

The cross products are not equal, so the fractions are not equivalent.

Exercise-4

1. Which of the following fractions are like fractions :

$$\frac{2}{5}, \frac{3}{4}, \frac{1}{5}, \frac{3}{5}, \frac{7}{2}, \frac{8}{9}, \frac{16}{5}, \frac{4}{7}$$

Like fractions are those fractions which have a common denominator

$\therefore$ $\frac{2}{5}, \frac{1}{5}, \frac{3}{5}, \frac{16}{5}$ are like fractions.

2. Compare the fractions :

(a) $\frac{4}{7} < \frac{6}{7}$

(b) L.C.M. of 9 and 4 = 36

$$\frac{1}{9} = \frac{1 \times 4}{9 \times 4} = \frac{4}{36}$$

$$\frac{1}{4} = \frac{1 \times 9}{4 \times 9} = \frac{9}{36}$$

$$\frac{4}{36} < \frac{9}{36}$$

Hence $\frac{1}{9} < \frac{1}{4}$

(c) $\frac{8}{25} < \frac{16}{25}$

(d) $\frac{4}{5} > \frac{3}{5}$

(e) L.C.M. of 13 and 7 = 91

$$\frac{7}{13} = \frac{7 \times 7}{13 \times 7} = \frac{49}{91}$$

$$\frac{1}{7} = \frac{1 \times 13}{7 \times 13} = \frac{13}{91}$$

$$\frac{49}{91} > \frac{13}{91}$$

Hence, $$\frac{7}{13} > \frac{1}{7}$$

(f) L.C.M. of 3 and 6 is 6.

$$\frac{2}{3} = \frac{2 \times 2}{3 \times 2} = \frac{4}{6}$$

$$\frac{4}{6} = \frac{4 \times 1}{6 \times 1} = \frac{4}{6}$$

$$\frac{4}{6} = \frac{4}{6}$$

Hence, $$\frac{2}{3} = \frac{4}{6}$$

3. Arrange the following in descending order :

(a) $$\frac{13}{15}, \frac{8}{15}, \frac{17}{15}, \frac{7}{15}, \frac{9}{15}$$

$$\frac{17}{15} > \frac{13}{15} > \frac{9}{15} > \frac{8}{15} > \frac{7}{15}$$

(b) $$\frac{3}{8}, \frac{5}{6}, \frac{2}{4}, \frac{1}{3}, \frac{6}{8}$$

L.C.M. of 8, 6, 4 and 3 = 24

$$\frac{3}{8} = \frac{3 \times 3}{8 \times 3} = \frac{9}{24}$$

$$\frac{5}{6} = \frac{5 \times 4}{6 \times 4} = \frac{20}{24}$$

$$\frac{2}{4} = \frac{2 \times 6}{4 \times 6} = \frac{12}{24}$$

$$\frac{1}{3} = \frac{1 \times 8}{3 \times 8} = \frac{8}{24}$$

$$\frac{6}{8} = \frac{6 \times 3}{8 \times 3} = \frac{18}{24}$$

$\therefore$ $$\frac{20}{24} < \frac{18}{24} < \frac{12}{24} < \frac{9}{24} < \frac{8}{24}$$

Hence, $$\frac{5}{6}, \frac{6}{8}, \frac{2}{4}, \frac{3}{8}, \frac{1}{3}$$

(c) $$\frac{5}{7}, \frac{5}{3}, \frac{5}{2}, \frac{5}{6}$$

L.C.M. of 7, 3, 2 and 6 = 42

$$\frac{5}{7} = \frac{5 \times 6}{7 \times 6} = \frac{30}{42}$$

$$\frac{5}{3}=\frac{5\times14}{3\times14}=\frac{70}{42}$$

$$\frac{5}{2}=\frac{5\times21}{2\times21}=\frac{105}{42}$$

$$\frac{5}{6}=\frac{5\times7}{6\times7}=\frac{35}{42}$$

$\therefore$ $\frac{105}{42}>\frac{70}{42}>\frac{35}{42}>\frac{30}{42}$

Hence, $\frac{5}{2}<\frac{5}{3}<\frac{5}{6}<\frac{5}{7}$

4. Arrange the following in ascending order :

(a) $\frac{7}{11},\frac{4}{11},\frac{9}{11},\frac{5}{11}$

$$\frac{4}{11}<\frac{5}{11}<\frac{7}{11}<\frac{9}{11}$$

(b) $\frac{1}{5},\frac{3}{7},\frac{7}{10},\frac{2}{14},\frac{6}{7}$

L.C.M. of 5, 7, 10 and 14 = 70

$$\frac{1}{5}=\frac{1\times14}{5\times14}=\frac{14}{70}$$

$$\frac{3}{7}=\frac{3\times10}{7\times10}=\frac{30}{70}$$

$$\frac{7}{10}=\frac{7\times7}{10\times7}=\frac{49}{70}$$

$$\frac{2}{14}=\frac{2\times5}{14\times5}=\frac{10}{70}$$

$$\frac{6}{7}=\frac{6\times10}{7\times10}=\frac{60}{70}$$

$\therefore$ $\frac{10}{70}<\frac{14}{7}<\frac{30}{70}<\frac{49}{70}<\frac{60}{70}$

Hence, $\frac{2}{14}<\frac{1}{5}<\frac{3}{7}<\frac{7}{10}<\frac{6}{7}$

(c) $\frac{3}{4},\frac{5}{8},\frac{13}{16},\frac{1}{2}$

L.C.M. of 4, 8, 16 and 2 = 16

$$\frac{3}{4}=\frac{3\times4}{4\times4}=\frac{12}{16}$$

$$\frac{5}{8}=\frac{5\times2}{8\times2}=\frac{10}{16}$$

$$\frac{13}{16}=\frac{13\times1}{16\times1}=\frac{13}{16}$$

$$\frac{1}{2} = \frac{1\times 8}{2\times 8} = \frac{8}{16}$$

$\therefore$ $\frac{8}{16} < \frac{10}{16} < \frac{12}{16} < \frac{13}{16}$

Hence, $\frac{1}{2} < \frac{5}{8} < \frac{3}{4} < \frac{13}{16}$

5. Ravi read pages of a book = 50

Total pages of the book = 200

Rashmi read pages = $\frac{1}{5}$ of the book

$= \frac{1}{5} \times 200 = 40$

Hence, Rashmi reads less.

Exercise-5

1. Find the sum :

(a) $\frac{3}{5} + \frac{1}{6}$

L.C.M. of 5 and 6 = 30

$\therefore$ $\frac{3}{5} = \frac{3\times 6}{5\times 6} = \frac{18}{30}$

$\frac{1}{6} = \frac{1\times 5}{6\times 5} = \frac{5}{30}$

Thus, $\frac{18}{30} + \frac{5}{30} = \frac{18+5}{30} = \frac{23}{30}$

` (b) $\frac{3}{8} + \frac{4}{8}$

$= \frac{3+4}{8} = \frac{7}{8}$

(c) $\frac{1}{4} + \frac{7}{10}$

L.C.M. of 4 and 10 is 20

$\frac{1}{4} = \frac{1\times 5}{4\times 5} = \frac{5}{20}$

$\frac{7}{10} = \frac{7\times 2}{10\times 2} = \frac{14}{20}$

Thus, $\frac{5}{20} + \frac{14}{20} = \frac{5+14}{20} = \frac{19}{20}$

(d) $2\frac{1}{2}+1\frac{1}{8}$

$=\frac{5}{2}+\frac{9}{8}$

L.C.M. of 2 and 8 is 8.

$\frac{5}{2}=\frac{5\times4}{2\times4}=\frac{20}{8}$

$\frac{9}{8}=\frac{9\times1}{8\times1}=\frac{9}{8}$

Thus, $\frac{20}{8}+\frac{9}{8}=\frac{20+9}{8}=\frac{29}{8}$

(e) $\frac{4}{13}+\frac{1}{13}+\frac{8}{13}$

$=\frac{4+1+8}{13}=\frac{13}{13}=1$

(f) $\frac{3}{4}+\frac{5}{6}$

L.C.M. of 4 and 6 is 12.

$\frac{3}{4}=\frac{3\times3}{4\times3}=\frac{9}{12}$

$\frac{5}{6}=\frac{5\times2}{6\times2}=\frac{10}{12}$

Thus, $\frac{9}{12}+\frac{10}{12}=\frac{9+10}{12}=\frac{19}{12}$

(g) $\frac{1}{2}+\frac{2}{3}+\frac{3}{4}$

L.C.M. of 2, 3 and 4 is 12.

$\frac{1}{2}=\frac{1\times6}{2\times6}=\frac{6}{12}$

$\frac{2}{3}=\frac{2\times4}{3\times4}=\frac{8}{12}$

$\frac{3}{4}=\frac{3\times3}{4\times3}=\frac{9}{12}$

Thus, $\frac{6}{12}+\frac{8}{12}+\frac{9}{12}$

$=\frac{6+8+9}{12}=\frac{23}{12}$

(h) $4+3\frac{1}{2}+1\frac{1}{4}$

$4+\frac{7}{2}+\frac{5}{4}$

L.C.M. of 2 and 4 is 4.

$$4 = \frac{4 \times 4}{1 \times 4} = \frac{16}{4}$$

$$\frac{7}{2} = \frac{7 \times 2}{2 \times 2} = \frac{14}{4}$$

$$\frac{5}{4} = \frac{5 \times 1}{4 \times 1} = \frac{5}{4}$$

Thus, $$\frac{16}{4} + \frac{14}{4} + \frac{5}{4} = \frac{16 + 14 + 5}{4} = \frac{35}{4}$$

$$= 8\frac{3}{4}$$

2. Find the difference :

(a) $$\frac{5}{9} - \frac{1}{9}$$

$$= \frac{5 - 1}{9} = \frac{4}{9}$$

(b) $$\frac{7}{10} - \frac{1}{2}$$

L.C.M. of 10 and 2 is 10.

$$\frac{7}{10} = \frac{7 \times 1}{10 \times 1} = \frac{7}{10}$$

$$\frac{1}{2} = \frac{1 \times 5}{2 \times 5} = \frac{5}{10}$$

So, $$\frac{7}{10} - \frac{5}{10} = \frac{7 - 5}{10} = \frac{2}{10} = \frac{1}{5}.$$

(c) $$\frac{1}{2} - \frac{3}{16}$$

L.C.M. of 2 and 16 is 16.

$$\frac{1}{2} = \frac{1 \times 8}{2 \times 8} = \frac{8}{16}$$

$$\frac{3}{16} = \frac{3 \times 1}{16 \times 1} = \frac{3}{16}$$

So, $$\frac{8}{16} - \frac{3}{16} = \frac{8 - 3}{16} = \frac{5}{16}$$

(d) $$1\frac{3}{4} - \frac{7}{12}$$

$$= \frac{7}{4} - \frac{7}{12}$$

L.C.M. of 4 and 12 is 12.

$$\frac{7}{4} = \frac{7 \times 3}{4 \times 3} = \frac{21}{12}$$

$$\frac{7}{12} = \frac{7 \times 1}{12 \times 1} = \frac{7}{12}$$

So, $$\frac{21}{12} - \frac{7}{12} = \frac{21 - 7}{12} = \frac{14}{12} = \frac{7}{6} = 1\frac{1}{6}$$

(e) $$\frac{43}{16} - \frac{9}{4}$$

L.C.M. of 16 and 4 is 16.

$$\frac{43}{16} = \frac{43 \times 1}{16 \times 1} = \frac{43}{16}$$

$$\frac{9}{4} = \frac{9 \times 4}{4 \times 4} = \frac{36}{16}$$

So, $$\frac{43}{16} - \frac{36}{16} = \frac{43 - 36}{16} = \frac{7}{16}$$

(f) $$8\frac{4}{5} - 2\frac{1}{15}$$

$$\frac{44}{5} - \frac{31}{15}$$

L.C.M. of 5 and 15 is 15.

$$\frac{44}{5} = \frac{44 \times 3}{5 \times 3} = \frac{132}{15}$$

$$\frac{31}{15} = \frac{31 \times 1}{15 \times 1} = \frac{31}{15}$$

So, $$\frac{132}{15} - \frac{31}{15} = \frac{132 - 31}{15} = \frac{101}{15} = 6\frac{11}{15}$$

(g) $$1\frac{1}{4} - \frac{1}{4}$$

$$= \frac{5}{4} - \frac{1}{4} = \frac{5 - 1}{4} = \frac{4}{4} = 1$$

(h) $$3\frac{2}{3} - 2$$

$$= \frac{11}{3} - \frac{2}{1}$$

L.C.M. of 3 and 1 is 3.

$$\frac{11}{3} = \frac{11 \times 1}{3 \times 1} = \frac{11}{3}$$

$$= \frac{2 \times 3}{1 \times 3} = \frac{6}{3}$$

3. Fill in the blanks :

(a) $\frac{4}{15} - 0 = \frac{4}{15}$

(b) $\frac{19}{4} - 0 = \frac{19}{4}$

(c) $\frac{7}{17} - \frac{6}{17} = \frac{7 - 6}{17} = \frac{1}{17}$

(d) $\frac{15}{6} - \frac{15}{6} = 0$

(e) $1\frac{5}{8} - 0 = 1\frac{5}{8}$

4. Simplify :

(a) $3\frac{3}{4} + 2\frac{1}{6} - 3\frac{7}{12}$

L.C.M. of 4, 6 and 12 is 12.

$$3\frac{3}{4} = \frac{15}{4} = \frac{15 \times 3}{4 \times 3} = \frac{45}{12}$$

$$2\frac{1}{6} = \frac{13}{6} = \frac{13 \times 2}{6 \times 2} = \frac{26}{12}$$

$$3\frac{7}{12} = \frac{43}{12} = \frac{43 \times 1}{12 \times 1} = \frac{43}{12}$$

So, $$\frac{45}{12} + \frac{26}{12} - \frac{43}{12} = \frac{45 + 26 - 43}{12}$$

$$\frac{26 + 2}{12} = \frac{28}{12} = \frac{7}{3}$$

(b) $$3\frac{3}{4} + 2\frac{1}{9} + 1\frac{1}{3}$$

$$\frac{15}{4} + \frac{19}{9} + \frac{4}{3}$$

L.C.M. of 4, 9 and 3 is 36.

$$\frac{15}{4} = \frac{15 \times 9}{4 \times 9} = \frac{135}{36}$$

$$\frac{19 \times 4}{9 \times 4} = \frac{76}{36}$$

$$\frac{4}{3} = \frac{4 \times 12}{3 \times 12} = \frac{48}{36}$$

So, $$\frac{135}{36} + \frac{76}{36} + \frac{48}{36}$$

$$= \frac{135 + 76 + 48}{36} = \frac{259}{36}$$

$$= 7\frac{7}{36}$$

(c) $$10\frac{3}{4} - 4\frac{1}{8} - 5\frac{5}{12}$$

$$\frac{43}{4} - \frac{33}{8} - \frac{65}{12}$$

L.C.M. of 4, 8 and 12 is 24.

$$\frac{43}{4} = \frac{43 \times 6}{4 \times 6} = \frac{258}{24}$$

$$\frac{33}{8} = \frac{33 \times 3}{8 \times 3} = \frac{99}{24}$$

$$\frac{65}{12} = \frac{65 \times 2}{12 \times 2} = \frac{130}{24}$$

So, $\frac{258}{24} - \frac{99}{24} - \frac{130}{24} = \frac{258 - 99 - 130}{24}$

$$= \frac{258 - 229}{24} = \frac{29}{24}$$

(d) $5\frac{1}{4} + 3\frac{1}{8} - 2\frac{1}{2}$

$$\frac{21}{4} + \frac{25}{8} - \frac{5}{2}$$

L.C.M. of 4, 8 and 2 is 8.

$$\frac{21}{4} = \frac{21 \times 2}{4 \times 2} = \frac{42}{8}$$

$$\frac{25}{8} = \frac{25 \times 1}{8 \times 1} = \frac{25}{8}$$

$$\frac{5}{2} = \frac{5 \times 4}{2 \times 4} = \frac{20}{8}$$

So, $\frac{42}{8} + \frac{25}{8} - \frac{20}{8} = \frac{42 + 25 - 20}{8}$

$$= \frac{67 - 20}{8} = \frac{47}{8}$$

Do the following :

5. $3\frac{1}{2} - \left(\frac{3}{4} - \frac{1}{8}\right)$

$$\frac{7}{2} - \frac{3}{4} + \frac{1}{8}$$

L.C.M. of 4, 8 and 2 is 8.

$$\frac{7}{2} = \frac{7 \times 4}{2 \times 4} = \frac{28}{8}$$

$$\frac{3}{4} = \frac{3 \times 2}{4 \times 2} = \frac{6}{8}$$

$$\frac{1}{8} = \frac{1 \times 1}{8 \times 1} = \frac{1}{8}$$

So, $\frac{28}{8} - \left(\frac{6}{8} - \frac{1}{8}\right) = \frac{28}{8} - \frac{6}{8} + \frac{1}{8}$

$$= \frac{28 - 6 + 1}{8} = \frac{29 - 6}{8} = \frac{23}{8}$$

6. $9 - \left(4\frac{3}{10} + 1\frac{1}{5}\right)$

$$= 9 - \left(\frac{43}{10} + \frac{6}{5}\right)$$

L.C.M. of 10 and 5 is 10.

$$9 = \frac{9 \times 10}{1 \times 10} = \frac{90}{10}$$

$$\frac{43}{10} = \frac{43 \times 1}{10 \times 1} = \frac{43}{10}$$

$$\frac{6}{5} = \frac{6 \times 2}{5 \times 2} = \frac{12}{10}$$

$\therefore$ $$= \frac{90}{10} - \frac{43}{10} - \frac{12}{10}$$

$$= \frac{90 - 43 - 12}{10} = \frac{90 - 55}{10}$$

$$= \frac{35}{10} = \frac{7}{2} = 3\frac{1}{2}$$

7. $\frac{9}{16} + 5\frac{3}{4} - 2\frac{1}{8}$

$$\frac{9}{16} + \frac{23}{4} - \frac{17}{8}$$

L.C.M. of 16, 4 and 8 is 16.

$$\frac{9}{16} = \frac{9 \times 1}{16 \times 1} = \frac{9}{16}$$

$$\frac{23}{4} = \frac{23 \times 4}{4 \times 4} = \frac{92}{16}$$

$$\frac{17}{8} = \frac{17 \times 2}{8 \times 2} = \frac{34}{16}$$

$\therefore$ $$\frac{9}{16} + \frac{92}{16} - \frac{34}{16} = \frac{101 - 34}{16} = \frac{67}{16} = 4\frac{3}{16}$$

9. Suppose we should add x to $\frac{9}{16}$

$$\frac{9}{16} + x = 15$$

or $$x = 15 - \frac{9}{16} = \frac{15 \times 16 - 9}{16}$$

$$x = \frac{231}{16} = 14\frac{7}{16}$$

9. Suppose x should be added to $\frac{3}{8}$.

$$\frac{3}{8} + x = 1$$

$$x = 1 - \frac{3}{8}$$

$$x = \frac{8 - 3}{8} = \frac{5}{8}$$

Exercise-6

1. Seeta studies on Friday $= \frac{1}{2}$ hr

Seeta studies on Saturday $= \frac{7}{4}$ hr

Seeta studies on Sunday $= \frac{1}{3}$ hr

Total hours $= \frac{1}{2} + \frac{7}{4} + \frac{1}{3}$

L.C.M. of 2, 4 and 3 is 12.

$$\frac{1}{2} = \frac{1 \times 6}{2 \times 6} = \frac{6}{12}$$

$$\frac{7}{4} = \frac{7 \times 3}{4 \times 3} = \frac{21}{12}$$

$$\frac{1}{3} = \frac{1 \times 4}{3 \times 4} = \frac{4}{12}$$

So, $\frac{6}{12} + \frac{21}{12} + \frac{4}{12}$

$$= \frac{6 + 21 + 4}{12} = \frac{31}{12}$$

2. A tailor has reel of thread $= 30\frac{1}{6} = \frac{181}{6}$ m

Thread used in stitching $= 23\frac{5}{6} = \frac{143}{6}$ m

Length of the thread left in the reel $= \frac{181}{6} - \frac{143}{6}$

$$= \frac{181 - 143}{6} = \frac{38}{6} = \frac{19}{3}$$

$$= 6\frac{1}{3} \text{ m}$$

3. Time taken by Gaurav to walk across the school ground $= \frac{4}{7}$ minute

Rahul takes to walk a cross the school ground $= \frac{7}{3}$ minute

L.C.M. of 7 and 3 is 21.

$$\frac{4}{7} = \frac{4 \times 3}{7 \times 3} = \frac{12}{21}$$

$$\frac{7}{3} = \frac{7 \times 7}{3 \times 7} = \frac{49}{21}$$

$\therefore$ $$\frac{12}{21} < \frac{49}{21}$$

$$\frac{4}{7} < \frac{7}{3}$$

$\therefore$ Gaurav takes less time.

4. Nidhi spent on a movie $= \frac{1}{2}$ of pocket money

Nidhi spent on a new pen $= \frac{1}{4}$ of pocket money

Total spent $= \frac{1}{2} + \frac{1}{4}$

L.C.M. of 2 and 4 is 4.

$$\frac{1}{2} = \frac{1 \times 2}{2 \times 2} = \frac{2}{4}$$

$$\frac{1}{4} = \frac{1 \times 1}{4 \times 1} = \frac{1}{4}$$

Total fraction of money spent $= \frac{2}{4} + \frac{1}{4} = \frac{2+1}{4} = \frac{3}{4}$

5. Rakesh filled petrol in his car $= 7\frac{3}{4} = \frac{31}{4}$ litre

Petrol left in the tank $= 5\frac{1}{2} = \frac{11}{2}$ litre

Petrol consumed by the car during the day $= \frac{31}{4} - \frac{11}{2}$

L.C.M. of 4 and 2 is 4.

$$\frac{31}{4} = \frac{31 \times 1}{4 \times 1} = \frac{31}{4}$$

$$\frac{11}{2} = \frac{11 \times 2}{2 \times 2} = \frac{22}{4}$$

Petrol consumed $= \frac{31}{4} - \frac{22}{4} = \frac{31-22}{4} = \frac{9}{4} = 2\frac{1}{4}$

Hence, $2\frac{1}{4}$ litre petrol was consumed by the car.

6. Distance of Ruby's house from her college $= 5\frac{2}{3} = \frac{17}{3}$ km

Ruby covers by metro train $= 4\frac{1}{2} = \frac{9}{2}$ km

She covers by rickshaw $= \frac{17}{3} - \frac{9}{2}$ km

L.C.M. of 3 and 2 is 6.

$$\frac{17}{3} = \frac{17 \times 2}{3 \times 2} = \frac{34}{6}$$

$$\frac{9}{2} = \frac{9 \times 3}{2 \times 3} = \frac{27}{6}$$

$\therefore$ $$\frac{34}{6} - \frac{27}{6} = \frac{7}{6}$$

$$= 1\frac{1}{6} \text{ km}$$

7. Payal bought ribbon $= 3\frac{1}{4} = \frac{13}{4}$ m

Nirmala bought ribbon $= 2\frac{3}{8} = \frac{19}{8}$ m

Rashmi bought ribbon $= 3\frac{1}{2} = \frac{7}{2}$ m

Total length of ribbon $= \frac{13}{4} + \frac{19}{8} + \frac{7}{2}$

$$= \frac{26 + 19 + 28}{8} = \frac{73}{8} = 9\frac{1}{8} \text{ m}$$

8. Perimeter of a triangle $= 15\frac{1}{7} = \frac{106}{7}$ m

Sum of two sides $= 9\frac{1}{14} = \frac{127}{14}$ m

Length of third side $= \frac{106}{7} - \frac{127}{14}$ m

L.C.M. 7 and 14 is 14.

$$\frac{106}{7} = \frac{106 \times 2}{7 \times 2} = \frac{212}{14}$$

$$\frac{127}{14} = \frac{127 \times 1}{14 \times 1} = \frac{127}{147}$$

$\therefore$ $$\frac{212}{14} - \frac{127}{14} = \frac{212 - 127}{14} = \frac{85}{14}$$

$$= 6\frac{1}{14} \text{ m}$$

Chapter-6 : Decimals

Exercise-1

1. Represent the following in the place value chart :

	Thousands	Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths
(a)	—	—	1	5	2	8	—
(b)	—	—	2	3	9	6	—
(c)	—	—	—	0	3	2	4
(d)	—	—	1	6	1	0	4
(e)	—	—	—	1	0	0	8

2. Write the name of the place of underlined digit :

(a) The place of 6 is hundredths
(b) The place of 9 is tenths
(c) The place of 7 is thousandths
(d) The place of 4 is hundredths

3. Write the number names for the following :

(a) $0 \cdot 6$
$0 \cdot 6$ = zero point six

(b) $5 \cdot 13$
$5 \cdot 13$ = Five point one three

(c) $2 \cdot 08$
$2 \cdot 08$ = Two point zero eight

(d) $68 \cdot 843$
$68 \cdot 843$ = Sixty eight point eight four three

4. Express the following in decimals :

(a) $\frac{4}{100} = 0 \cdot 04$
(b) $\frac{7}{10} = 0 \cdot 7$
(c) $2\frac{5}{10} = \frac{25}{10} = 2 \cdot 5$
(d) $6\frac{8}{10} = \frac{68}{10} = 6 \cdot 8$
(e) Seven tenths $\frac{7}{10} = 0 \cdot 7$
(f) 7 and 2 tenths $= 7\frac{2}{10}$
(g) $\frac{28}{1000} = 0 \cdot 028$
(h) $\frac{15}{100} = 0 \cdot 15$

5. Write the following decimal numbers in expanded from :

(a) $0 \cdot 604$
$= 0 + \frac{6}{10} + \frac{0}{100} + \frac{4}{1000}$
$= 0 + 0 \cdot 6 + 0 + 0 \cdot 004$

(b) $18 \cdot 084$
$= 10 + 8 + \frac{0}{10} + \frac{8}{100} + \frac{4}{1000}$
$= 10 + 8 + 0 + 0 \cdot 08 + 0 \cdot 004$

(c) $6 \cdot 932$
$= 6 + \frac{9}{10} + \frac{3}{100} + \frac{2}{1000}$
$= 6 + 0 \cdot 9 + 0 \cdot 03 + 0 \cdot 002$

(d) $486 \cdot 3$

$$400 + 80 + 6 + \frac{3}{10}$$

$$= 400 + 80 + 6 + 0 \cdot 3$$

(e) $89 \cdot 34$

$$= 80 + 9 + \frac{3}{10} + \frac{4}{100}$$

$$= 80 + 9 + 0 \cdot 3 + 0 \cdot 04$$

6. Change the following in like decimals :

(a) $9 \cdot 386, 4 \cdot 6$

Maximum number of decimal places is 3 in $9 \cdot 386$

$\therefore$ $4 \cdot 6$ needs to be changed by putting required number of zeroes at the end of decimal part

Unlike decimal	Like decimal
$4 \cdot 6$	$4 \cdot 600$

(b) $0 \cdot 8, 3 \cdot 69, 3 \cdot 124$

Since maximum number of decimal places is 3 in $3 \cdot 124$

$\therefore$ $0 \cdot 8$ and $3 \cdot 69$ need to be changed by putting required number of zeroes at the end of decimal part.

Unlike decimal	Like decimal
$0 \cdot 8$	$0 \cdot 800$
$3 \cdot 69$	$3 \cdot 690$

(c) $200 \cdot 01, 306 \cdot 1, 2 \cdot 8$

Since maximum number of decimal places is 2 in $200 \cdot 01$

$\therefore$ $306 \cdot 01$ and $2 \cdot 8$ need to be changed by putting required number of zeroes at the end of decimal part.

Unlike decimal	Like decimal
$306 \cdot 1$	$306 \cdot 10$
$2 \cdot 8$	$2 \cdot 80$

(d) $9 \cdot 8, 8 \cdot 79, 8 \cdot 079$

Since maximum number of decimal places is 3 in $8 \cdot 079$

$\therefore$ $9 \cdot 8$ and $8 \cdot 79$ need to be changed by putting required number of zeroes at the end of decimal part.

Unlike decimal	Like decimal
$9 \cdot 8$	$9 \cdot 800$
$8 \cdot 79$	$8 \cdot 790$

Exercise-2

1. Fill in the blanks with > or < :

(a) $0 \cdot 04 < 0 \cdot 06$ (b) $3 \cdot 62 > 3 \cdot 26$

(c) $0 \cdot 8 < 7 \cdot 96$ (Convert into like decimal)

$0 \cdot 80 < 7 \cdot 96$

(d) $0 \cdot 009 < 0 \cdot 09$ (Convert into like decimal)

$0 \cdot 009 < 0 \cdot 090$

(e) $8 \cdot 18 < 8 \cdot 61$

2. Which is greater?

(a) $0 \cdot 052$ or $0 \cdot 51$ (Convert into like decimal)

$0 \cdot 052 < 0 \cdot 510$

(b) $2 \cdot 52$ or $00 \cdot 88$

$2 \cdot 52 > 00 \cdot 88$

(c) $0 \cdot 6$ or $0 \cdot 06$ (Convert into like decimal)

$0 \cdot 6 > 0 \cdot 06$

(d) $1 \cdot 431$ or $1 \cdot 79$ (Convert into like decimal)

$1 \cdot 431 < 1 \cdot 790$

(e) $1 \cdot 33$ or $1 \cdot 20$ (Convert int like decimal)

$1 \cdot 33 > 1 \cdot 20$

3. Write the following decimal numbers in ascending order :

(a) $6 \cdot 9, 5 \cdot 09, 5 \cdot 83$

$6 \cdot 9 \quad 5 \cdot 09 \quad 5 \cdot 83$

$\downarrow$

$6 \cdot 90 \quad 5 \cdot 09 \quad 5 \cdot 83$

$5 \cdot 09 < 5 \cdot 83 < 6 \cdot 90$

Hence, $5 \cdot 09 < 5 \cdot 83 < 6 \cdot 9$

(b) $7 \cdot 06, 7 \cdot 15, 7 \cdot 32, 7 \cdot 08$

Hence , $7 \cdot 06 < 7 \cdot 08 < 7 \cdot 15 < 7 \cdot 32$

4. Write the following decimal numbers in descending order :

(a) $3 \cdot 48, 3 \cdot 49, 3 \cdot 5, 3 \cdot 05$

$3 \cdot 48 \quad 3 \cdot 49 \quad 3 \cdot 5 \quad 3 \cdot 05$

$\downarrow$

$3 \cdot 48 \quad 3 \cdot 49 \quad 3 \cdot 50 \quad 3 \cdot 05$

Hence $3 \cdot 50 > 3 \cdot 49 > 3 \cdot 48 > 3 \cdot 05$

$3 \cdot 5 > 3 \cdot 49 > 3 \cdot 48 > 3 \cdot 05$

(b) $6 \cdot 76, 67 \cdot 67, 6 \cdot 77, 7 \cdot 6$

$6 \cdot 76 \quad 67 \cdot 67 \quad 6 \cdot 77 \quad 7 \cdot 6$

$\downarrow$

$6 \cdot 76 \quad 67 \cdot 67 \quad 6 \cdot 77 \quad 7 \cdot 60$

Hence, $67 \cdot 67 > 7 \cdot 6 > 6 \cdot 77 > 6 \cdot 76$

5. Team *A* secured = $84 \cdot 5$ points

Team *B* secured = 85 points

$84 \cdot 5$ points 85 points

$\downarrow$

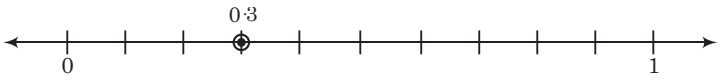
$84 \cdot 5$ points $85 \cdot 0$ point

$85 \cdot 0$ points > $84 \cdot 5$ points

Hence, Team *B* won the quiz.

6. Show the following numbers on the number line :

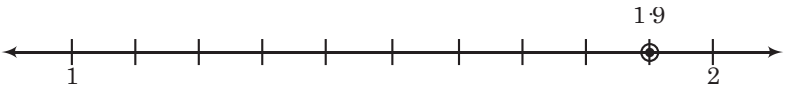
(a) $0 \cdot 3$



$0 \cdot 3 = \frac{3}{10}$

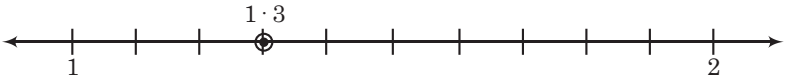
$0 \cdot 3 = \frac{3}{10}$ Since denominator is 10, divide 1 unit (0 and 1) into 10 equal parts and the 3rd point from 0 towards 1 is $0 \cdot 3$

(b) $1 \cdot 9$



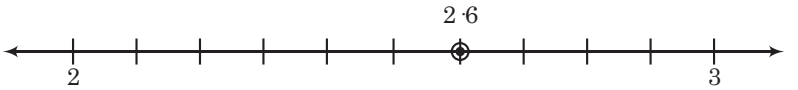
$1 \cdot 9 = \frac{19}{10} = 1\frac{9}{10}$ lies between l and 2, divide 1 unit (1 to 2) into 10 equal parts and 9th point from 1 towards 2 is $1 \cdot 9$.

(c) $1 \cdot 3$



$1 \cdot 3 = \frac{13}{10} = 1\frac{3}{10}$ lies between 1 and 2, divide 1 unit (1 to 2) into 10 equal parts and third point from 1 towards 2 is $1 \cdot 3$.

(d) $2 \cdot 6$



$2 \cdot 6 = \frac{26}{10} = 2\frac{6}{10}$ lies between 2 and 3 (See number line).

Exercise-3

1. Write the following in cm using decimals :

(a) 62 mm

$$1 \text{ mm} = \frac{1}{10} \text{ cm}$$

$$62 \text{ mm} = 62 \times \frac{1}{10} = \frac{62}{10} = 6 \cdot 2 \text{ cm}$$

(b) 450 mm

$$1 \text{ mm} = \frac{1}{10} \text{ cm}$$

$$450 \text{ mm} = 450 \times \frac{1}{10} = \frac{450}{10} = 45 \cdot 0 \text{ cm}$$

(c) 20 cm 10 mm

$$20 \text{ cm } 10 \text{ mm} = 20 \text{ cm} + 10 \times \frac{1}{10} \text{ cm}$$

$$= 20 \text{ cm} + 1 \cdot 0 \text{ cm} = 21 \text{ cm}$$

2. Express the following as m using decimals :

(a) 650 cm

$$1\text{ m} = 100\text{ cm}$$

$$1\text{ cm} = \frac{1}{100}\text{ m}$$

$$650\text{ cm} = 650 \times \frac{1}{100} = \frac{650}{100} = 6 \cdot 5\text{ m}$$

(b) 4 m 30 cm

$$1\text{ cm} = \frac{1}{10}\text{ m}$$

$$4\text{ m }30\text{ cm} = 4\text{ m} + 30 \times \frac{1}{100}\text{ m} = 4\text{ m} + 0 \cdot 3\text{ m}$$

$$= 4 \cdot 3\text{ m}$$

(c) 254 cm

$$1\text{ cm} = \frac{1}{100}\text{ m}$$

$$1254\text{ cm} = 1254 \times \frac{1}{100} = 12 \cdot 54\text{ m}$$

3. Convert the following in km :

(a 5405 m

$$1\text{ km} = 1000\text{ m}$$

$$1\text{ m} = \frac{1}{1000}\text{ km}$$

$$5405\text{ m} = 5405 \times \frac{1}{1000} = 5 \cdot 405\text{ km}$$

(b) 60 km 343 m

$$1\text{ m} = \frac{1}{100}\text{ km}$$

$$60\text{ km }343\text{ m} = 60\text{ km} + 343 \times \frac{1}{1000}\text{ km}$$

$$= 60\text{ km} + 0 \cdot 343\text{ km}$$

$$= 60 \cdot 343\text{ km}$$

(c) 8 m

$$1\text{ m} = \frac{1}{1000}\text{ km}$$

$$8\text{ m} = \frac{8}{1000} = 0 \cdot 008\text{ km}$$

4. Express the following as kg using decimals :

(a) 28 g

$$1\text{ kg} = 1000\text{ g},\ 1\text{ g} = \frac{1}{1000}\text{ kg}$$

$$28\text{ g} = 28 \times \frac{1}{1000} = \frac{28}{1000} = 0 \cdot 028\text{ kg}$$

(b) 25 kg 850 g

$$1\text{ g} = \frac{1}{1000}\text{ kg}$$

$$25\text{ kg }850\text{ g} = 25\text{ kg} + 850 \times \frac{1}{1000}\text{ kg}$$

$$= 25\text{ kg} + 0 \cdot 850\text{ kg}$$

$$= 25 \cdot 850\text{ kg}$$

(c) 5005 g

$$1\text{ g} = \frac{1}{1000}\text{ kg}$$

$$5005\text{ g} = 5005 \times \frac{1}{1000}\text{ kg}$$

$$= 5 \cdot 005\text{ kg}$$

5. Convert the following in ₹ :

(a) 60 paise

$$1\text{ paisa} = \frac{1}{100}₹$$

$$60\text{ paisa} = 60 \times \frac{1}{100}₹$$

$$= \frac{60}{100}₹ = 0 \cdot 60₹$$

(b) 420 paise

$$1\text{ paisa} = \frac{1}{100}₹$$

$$420\text{ paise} = 420 \times \frac{1}{100}₹ = \frac{420}{100} = 4 \cdot 20₹$$

(c) 10 rupees 75 paise

$$1\text{ paisa} = \frac{1}{100}₹$$

$$10\text{ rupees }75\text{ paise} = 10\text{ rupees} + 75 \times \frac{1}{100}\text{ rupees}$$

$$= 10\text{ rupees} + \frac{75}{100}\text{ rupees}$$

$$= 10\text{ rupees} + 0 \cdot 75\text{ rupees}$$

$$= 10 \cdot 75\text{ rupees} = 10 \cdot 75₹$$

6. Express the following without decimals :

(a) ₹ 20 · 50

1 ₹ = 100 paise

₹ 20 · 50 = 20 · 50 × 100 paise

= 2050 paise

(b) 10 · 10 m

1 m = 100 cm

10 · 10 m = 10 · 10 × 100 cm = 1010 cm

(c) $5 \cdot 2$ cm

1 cm $= 10$ mm

$5 \cdot 2$ cm $= 5 \cdot 2 \times 10$ mm $= 52$ mm

(d) $20 \cdot 360$ km

1 km $= 1000$ m

$20 \cdot 360$ km $= 20 \cdot 360 \times 1000$ m

$= 20360$ m

(e) $50 \cdot 230$ kg

1 kg $= 1000$ g

$50 \cdot 230$ kg $= 50 \cdot 230 \times 1000$ g

$= 50230$ g

(f) $6 \cdot 05$ km

1 km $= 1000$ m

$6 \cdot 05$ km $= 6 \cdot 05 \times 1000$ m

$= 6050$ m

7. (a) Express 25 mm into cm, m and km

25 mm into cm

1 cm $= 10$ mm

1 mm $= \frac{1}{10}$ cm

25 mm $= 25 \times \frac{1}{10}$ cm $= 2 \cdot 5$

25 mm into m

25 mm $= 2 \cdot 5$ cm

1 m $= 100$ cm

1 cm $= \frac{1}{100}$ m

$2 \cdot 5$ cm $= 2 \cdot 5 \times \frac{1}{100}$ m $= 0 \cdot 025$ m

25 mm into km

25 mm $= 2 \cdot 5$ cm

$2 \cdot 5$ cm $= 0 \cdot 025$ m

1 km $= 1000$ m

1 m $= \frac{1}{1000}$ km

$= 0 \cdot 025 \times \frac{1}{1000}$ km

$= 0 \cdot 000025$ km

(b) Convert 5000 ml into l

$1\ l = 1000$ ml

1 ml $= \frac{1}{1000}\ l$

5000 ml $= 5000 \times \frac{1}{1000}\ l$

$$= \frac{5000}{1000}\, l = 5 \cdot 000\, l = 5 \text{ litres}$$

8. Mr. Sharma bought

Spinach = 500 g
Onions = 750 g
Garlic = 100 g
Ginger = 150 g
Potatoes = 750 g

$\therefore$ Total weight of vegetables = 500 + 750 + 100 + 150 + `750 = 2250 g

$$1 \text{ kg} = 1000 \text{ g}$$

$$1 \text{ g} = \frac{1}{1000} \text{ kg}$$

$$2250 \text{ g} = 2250 \times \frac{1}{1000} \text{ kg} = 2 \cdot 250 \text{ kg}$$

Exercise-4

1. Find the sum :

(a) 9 · 839, 5 · 69, 3 · 03

	T	O	Te	H	Th
		9	8	3	9
		5	6	9	0
+		3	0	3	0
	18	5	5	9	

18 · 559 **Ans.**

(b) 15 · 44, 65 · 20, 20

	T	O	Te	H	Th
	1	5	4	4	0
	6	5	2	0	0
+	2	0	0	0	0
	1 0	0	6	4	0

100 · 64 **Ans.**

(c) 15 · 5, 0 · 046, 220 · 660, 2 · 750

	H	T	O	Te	H	Tho
				0	1	5
			0	0	4	6
	2	2	0	6	6	0
+			2	7	5	0
	2	3	8	9	5	6

238 · 956 **Ans.**

(d) $280 \cdot 69 + 25 \cdot 2 + 38$

	T	O	Te	H	Th
	2	8	0	6	9
	0	2	5	2	0
+		3	8	0	0
	3	4	3	8	9

$343 \cdot 89$ **Ans**.

2. A labourer earned first day = $45 \cdot 00$ ₹

Second day he earned = $48 \cdot 5$ ₹

Third day he earned = $51 \cdot 25$ ₹

Total money earned = $45 \cdot 00$ ₹ + $48 \cdot 5$ ₹ + $51 \cdot 25$ ₹

4	5	·	0	0
4	8	·	5	0
5	1	·	2	5
14	4	·	7	5

Hence, total money earned = $144 \cdot 75$ ₹ **Ans.**

3. Mona has ribbons of length = 2 m 30 cm

Seeta has ribbons of length = 4 m 80 cm

Sum of the lengths of both the ribbons

	2 m	30 cm
+	4 m	8 cm
	7 m	10 cm

Hence, sum of the lengths of both the ribbons = 7 m 10 cm **Ans.**

4. A shopkeeper sold wheat on a day = $37 \cdot 750$ kg

He sold wheat on a next day = $42 \cdot 250$ kg

On the third day he sold wheat = $50 \cdot 500$ kg

Total wheat in he sold = $37 \cdot 750$ kg + $42 \cdot 250$ kg + $50 \cdot 500$ kg

3	7	·	7	5	0
4	2	·	2	5	0
5	0	·	5	0	0
13	0	·	5	0	0

$130 \cdot 500$ kg **Ans.**

5. Krishnam walks in the morning = 2 km 10 m

He walks in the evening = 1 km 20 m

Total distance he walks in a day

	2 km	10 m
+	1 km	20 m
	3 km	30 m

3 km 30 m **Ans.**

6. Earning on Monday = ₹ 330 · 50

Earning on Tuesday = ₹ 150 · 70

Earning on Wednesday = ₹ 560 · 00

Earning on Thursday = ₹ 275 · 70

Earning on Friday = ₹ 175 · 65

Earning on Saturday = ₹ 300 · 00

Earning on Sunday = No earning

The total earnings = ₹ 330 · 50 + ₹ 150 · 70 + ₹ 560 · 00 + ₹ 275 · 70 + ₹ 175 · 65 + ₹ 300 · 00 + ₹ 0

= ₹ 1792 · 55 **Ans.**

Exercise-5

1. Fill in the blanks :

(a) 0 · 78 – 0 · 43 = 0 · 35 (b) 0 · 7 – 0 · 4 = 0 · 3

(c) 0 · 86 – 0 · 30 = 0 · 56 (d) 0 · 705 – 0 · 350 = 0 · 355

2. Subtract :

(a) 0 · 783 from 2 · 9

	2	·	9	0	0	
–	0	·	7	8	3	
	2	·	1	1	7	

(b) 2 · 39 from 4 · 4

	4	·	4	0	
–	2	·	3	9	
	2	·	0	1	

(c) 0 · 135 from 0 · 3

	0	·	3	0	0	
–	0	·	1	3	5	
	0	·	1	6	5	

(d) 59 · 05 from 69 · 45

	6	9	·	4	5	
–	5	9	·	0	5	
	1	0	·	4	0	

3. Subtract the sum of 12 · 5 and 24 · 642 from 75 · 23.

	1	2	·	5	0	0
+	2	4	·	6	4	2
	3	7	·	1	4	2

37 · 142 from 75 · 23

	7	5	·	2	3	0
–	3	7	·	1	4	2
	3	8	·	0	8	8

4. A man had = 86 · 50 ₹

He purchased a water bottle for = ₹ 38 · 50

∴ Money left with him = ₹ 86 · 50 – ₹ 38 · 50

$$\begin{array}{rcccc} & 8 & 6 & \cdot & 5 & 0 \\ - & 3 & 8 & \cdot & 5 & 0 \\ \hline & 4 & 8 & \cdot & 0 & 0 \end{array}$$

5. Ananya had in her piggy bank = ₹ 495

She gave money to Radhika = ₹ 132 · 80

She gave money to her sister = ₹ 85

Money left in her piggy bank

= 495 – 132 · 80 – 85

= 495 – 217 · 80

= 277 · 20 ₹

Hence, 277 · 20 ₹ left in her piggy bank.

6. A shopkeeper buys wheat = 1673 · 200 kg

He sells wheat = 985 · 100 kg

Now, wheat left in his shop = 1673 · 200 – 985 · 100

= 688 · 100 kg

Hence, 688 · 100 kg wheat is left in his shop

7. An electrician bought wires = 800 metres

He sold wire to one customer = 43 m 75 cm

He sold wire to another customer = 148 m 60 cm

Total wire sold by electrician = 43 m 75 cm + 148 m 60 cm

= 191 m 135 cm

= 192 m 35 cm

Now, length of wire left with him = 800 m – 19 m 35 cm

= 607 m 65 cm

8. Take away from 18 to get 4 · 96

18 – 4 · 96 = 13 · 04

∴ We should be take away 13 · 04

Chapter-7 : Algebra

Exercise-1

1. Construct the following patterns of houses with matchsticks :

No. of houses	1	2	3	7	9	15	21	n
No. of matchsticks	6	11	16	36	46	76	106	$5n+1$

2.

No. of triangles formed	1	2	3	4	5	6	7	8	n
No. of matchsticks required	3	3	7	9	11	13	15	17	$2n+1$

3. Nishi is younger than Nidhi = 4 years

Nishi's age = Nidhi's age – 4 years

Nidhi's age = z years

Nishi's age = $z - 4$ years

4. Keys on a mobile phone handset = 16

Keys in terms of m number of handsets = $m \times 16$

$= 16\,m$

5. Cadets stand in a row = 8

No. of rows in the parade

$\therefore$ No. of cadets in the parade = $8 \times p = 8p$

So, there are $8\ p$ cadets in the parade.

6. Ram gave Sita = ₹ 50

Ram had money = ₹ x

Now Ram have money = $x - 50$

Hence, Ram has $(x - 50)$ ₹ money left.

7. Apples in a box = 60

Total number of apples taking b boxes = $60 \times b = 60\,b$

8. Let side of a pentagon = s

A regular pentagon has = 5 sides

Perimeter of the regular pentagon = $5 \times s = 5s$

Exercise-2

1. Write the following using numbers, literals and signs of basic operations :

(a) 5 subtracted from y

$y - 5$

(b) Twice of x subtracted from y

$y - 2x$

(c) m is increased by 5

$m + 5$

(d) p taken away from twice q

$2q - p$

(e) x multiplied by 11

$11x$

2. Write the statement for the following expressions :

(a) $\frac{y}{5} = y$ divided by 5

(b) $-9q = q$ multiplied by (-9)

(c) $b + 15 = b$ increased by 15

(d) $3x - 5 = 5$ subtracted from thrice of x

(e) $2z - 6 = 6$ taken away from twice z

3. Length of a rectangular hall = b m

Breadth of rectangular hall = $4b - 6$

4. Expression for z

z is multiplied by $6 = 6z$

3 Subtracted from the product = $6z - 3$

Hence, the expression is $6z - 3$

5. Taking Vidushi's present age to be x years, anser the following questions :

(a) What will be her age 12 years from now?

Vidushi's present age = x years

Age after 12 years = $12 + x$ years

(b) What was her age 6 years back?

Vidhushi's age 6 years back = $x - 6$

(c) Vidushi's mother's age is three times Vidushi's age.

Vidushi's age = x

Vidushi's mother's age = $3x$

(d) Vidushi's father is 5 years older than her mother. What is her father's age?

Vidushi' mother's age = $3x$

Vidushi's father's age = $3x + 5$

6. Find the value of following algebraic expressions :

(a) $2a + 15$ at $a = 6$

By substituting $a = 6$ in the given equation

$$2a + 15$$
$$= 2 \times 6 + 15$$
$$= 12 + 15 = 27$$

$\therefore$ The value of $2a + 15$ at $a = 6$ is 27.

(b) $2a + b - 3$ at $a = 2, b = 1$

By substituting $a = 2, b = 1$ in the given expression

$$2a + b - 3$$
$$= 2 \times 2 + 1 - 3$$
$$= 4 + 1 - 3 \ = 5 - 3 = 2$$

$\therefore$ The value of $2a + b - 3$ at $a = 2, b = 1$ is 2.

(c) $6n + 8p$ at $n = 3,\ p = 2$

By substituting $n = 3,\ p = 2$ in the given expression $6n + 8p$

$$= 6 \times 3 + 8 \times 2$$
$$= 18 + 16 \ = 34$$

$\therefore$ The value of $6n + 8p$ at $n = 3,\ p = 2$ is 34.

(d) $\frac{77}{x} + 4$ at $x = 11$

By substituting $x = 11$ in the given expression $\frac{77}{x} + 4$

$$= \frac{77}{11} + 4 = 7 + 4 = 11$$

$\therefore$ The value of $\frac{77}{x} + 4$ is 11.

7. Let Vishu's age = x

Ratna's present age = $5 \times x = 5x$

Ratna's age 3 years ago = $5x - 3$

Hence, Ratha's age three years ago = $5x - 3$

Exercise-3

1. Write the following as equations :

(i) Fill times a number x is 40.

$$5x = 40$$

(ii) 5 more than a number p is 12.

$$p + 5 = 12$$

(iii) A number r plus 3 is 15.

$$r + 3 = 15$$

(iv) Twice a number increased by 7 is 13

$$2x + 7 = 13$$

(v) 6 times a number decreased by 4 is 10

$$6x - 4 = 10$$

2. Determine by substitution, if :

(i) -1 is a root of $5x = -5$

$$x = -1$$
$$5 \times (-1) = -5$$
$$-5 = -5$$

Yes, (-1) is a root of $5x = -5$

(ii) 5 is a solution of $7x - 35 = 0$

Putting $x = 5$

$$7x - 35 = 0$$
$$7 \times 5 - 35 = 0$$
$$35 - 35 = 0$$
$$0 = 0$$

Yes, 5 is a solution of $7x - 35 = 0$

(iii) 4 is a root of $2x - 3 = 5$

Putting $x = 4$

$$2x - 3 = 5$$
$$2 \times 4 - 3 = 5$$
$$8 - 3 = 5$$
$$5 = 5$$

Yes, 4 is a root of $2x - 3 = 5$

(iv) -3 is a solution of $x^2 + 2 = 13$

Putting $x = -3$

$$x^2 + 2 = 13$$
$$(-3)^2 + 2 = 13$$
$$9 + 2 = 13$$
$$11 \neq 13$$

No, -3 is not a solution of $x^2 + 2 = 13$.

(v) 7 is a solution of $7x = 49$

Putting $x = 7$

$$7x = 49$$

$7 \times 7 = 49$

$49 = 49$

Yes, 7 is a solution of $7x = 49$.

3. Solve the following equations by using trial and error method :

(i) $3x = 21$

By trial and error method

x	L.H.S.	R.H.S.	Observation
0	$3x$	21	
1	$3 \times 1 = 3$	21	L.H.S. ≠ R.H.S.
2	$3 \times 2 = 6$	21	L.H.S. ≠ R.H.S.
3	$3 \times 3 = 9$	21	L.H.S. ≠ R.H.S.
4	$3 \times 4 = 12$	21	L.H.S. ≠ R.H.S.
5	$3 \times 5 = 15$	21	L.H.S. ≠ R.H.S.
6	$3 \times 6 = 18$	21	L.H.S. ≠ R.H.S.
7	$3 \times 7 = 21$	21	L.H.S. = R.H.S.

Since at $x = 7$, LH.S. = R.H.S.

$\therefore$ $x = 7$ is the solution of equation $3x = 21$

(ii) $3x + 12 = 48$

By trial and error method

x	L.H.S.	R.H.S.	Observation
0	$3x + 12$	48	
1	$3 \times 1 + 12 = 15$	48	L.H.S. ≠ R.H.S.
2	$3 \times 2 + 12 = 6 + 12 = 18$	48	L.H.S. ≠ R.H.S.
3	$3 \times 3 + 12 = 9 + 12 = 21$	48	L.H.S. ≠ R.H.S.
4	$3 \times 4 + 12 = 12 + 12 = 24$	48	L.H.S. ≠ R.H.S.
5	$3 \times 5 + 12 = 15 + 12 = 27$	48	L.H.S. ≠ R.H.S.
6	$3 \times 6 + 12 = 18 + 12 = 30$	48	L.H.S. ≠ R.H.S.
7	$3 \times 7 + 12 = 21 + 12 = 33$	48	L.H.S. ≠ R.H.S.
8	$3 \times 8 + 12 = 24 + 12 = 36$	48	L.H.S. ≠ R.H.S.
9	$3 \times 9 + 12 = 27 + 12 = 39$	48	L.H.S. ≠ R.H.S.
10	$3 \times 10 + 12 = 30 + 12 = 42$	48	L.H.S. ≠ R.H.S.
11	$3 \times 11 + 12 = 33 + 12 = 45$	48	L.H.S. ≠ R.H.S.
12	$3 \times 12 + 12 = 36 + 12 = 48$	48	L.H.S. = R.H.S.

Since at $x = 12$, L.H.S. = R.H.S.

$\therefore$ $x = 12$ is the solution of equation $3x + 12 = 48$

(iii) $x - 3 = 4$

Trial and erron method

x	L.H.S.	R.H.S.	Observation
0	$x - 3$	4	
1	$1 - 3 = -2$	4	L.H.S. $\neq$ R.H.S.
2	$2 - 3 = -1$	4	L.H.S. $\neq$ R.H.S.
3	$3 - 3 = 0$	4	L.H.S. $\neq$ R.H.S.
4	$4 - 3 = 1$	4	L.H.S. $\neq$ R.H.S.
5	$5 - 3 = 2$	4	L.H.S. $\neq$ R.H.S.
6	$6 - 3 = 3$	4	L.H.S. $\neq$ R.H.S.
7	$7 - 3 = 4$	4	L.H.S. = R.H.S.

Since at $x = 7$, L.H.S. = R.H.S.

$\therefore$ $x = 7$ is the solution of equation $x - 3 = 4$

(iv) $\frac{7x}{3} = 21$

Trial and error method

x	L.H.S.	R.H.S.	Observation
0	$\frac{7 \times 0}{3}$	21	
1	$\frac{7 \times 1}{3} = \frac{7}{3} = 2 \cdot 3$	21	L.H.S. $\neq$ R.H.S.
2	$\frac{7 \times 2}{3} = \frac{14}{3} = 4 \cdot 6$	21	L.H.S. $\neq$ R.H.S.
3	$\frac{7 \times 3}{3} = \frac{21}{3} = 7$	21	L.H.S. $\neq$ R.H.S.
4	$\frac{7 \times 4}{3} = \frac{28}{3} = 9 \cdot 3$	21	L.H.S. $\neq$ R.H.S.
5	$\frac{7 \times 5}{3} = \frac{35}{3} = 11 \cdot 6$	21	L.H.S. $\neq$ R.H.S.
6	$\frac{7 \times 6}{3} = \frac{42}{3} = 14$	21	L.H.S. $\neq$ R.H.S.
7	$\frac{7 \times 7}{3} = \frac{49}{3} = 16 \cdot 3$	21	L.H.S. $\neq$ R.H.S.
8	$\frac{7 \times 8}{3} = \frac{56}{3} = 18 \cdot 6$	21	L.H.S. $\neq$ R.H.S.
9	$\frac{7 \times 9}{3} = \frac{63}{3} = 21$	21	L.H.S. = R.H.S.

Since at $x = 9$, L.H.S. = R.H.S.

$\therefore$ $x = 9$ is the solution of equation $\frac{7x}{3} = 21$.

4. Solve the following and check your answer :

(i) $2x + 4 = 10$

$2x = 10 - 4$

$2x = 6$

$x = \frac{6}{2} = 3$

(ii) $2y - 3 = 3$

$2y = 3 + 3$

$2y = 6$

$y = \frac{6}{2} = 3$

(iii) $2x - 4 = -8$

$2x = -8 + 4$

$2x = -4$

$x = \frac{-4}{2} = -2$

(iv) $\frac{x-1}{3} = 14$

$x - 1 = 14 \times 3$

$x - 1 = 42$

$x = 42 + 1 = 43$

(v) $5x = 100$

$x = \frac{100}{5} = 20$

5.

x	1	2	3	4	5	6	7	8
$\frac{2x}{5}$	$\frac{2}{5}$	$\frac{4}{5}$	$\frac{6}{5}$	$\frac{2\times4}{5} = \frac{8}{5}$	$\frac{2\times5}{5} = \frac{10}{5}$	$\frac{2\times6}{5} = \frac{12}{5}$	$\frac{2\times7}{5} = \frac{14}{5}$	$\frac{2\times8}{5} = \frac{16}{5}$

6. Let the number be x

Twice the number = $2x$

$$2x + \frac{x}{2} = 75$$

$$\frac{4x + x}{2} = 75$$

$$(4x + x) = 75 \times 2$$

$$5x = 75 \times 2$$

$$x = \frac{75 \times 2}{5} = 15 \times 2 = 30$$

7. Let Ankit's age = x years

Sandhya's age = y years

Then $x = y + 6$ ... (1)

Five years ago

$$x - 5 = 3(y - 5)$$

$$x - 5 = 3y - 15$$

$$x = 3y - 10 \quad \text{... (2)}$$

Put $x = 3y - 10$ in equation (1)

$$3y - 10 = y + 6$$

$$3y - y = 10 + 6$$

$$2y = 16$$

$$y = 8$$

Put $y = 8$ in equation (2)

$$x = 3 \times 8 - 10$$

$x = 24 - 10 = 14$

$\therefore$ $x = 14$ years

$y = 8$ years **Ans.**

8. Cost of a pen = ₹ 3

She bought pens for = ₹ 96

No. of she bought = $\frac{96}{3} = 32$

Hence, she bought 32 pens. **Ans.**

9. Fill up the boxes :

(a) $3x - 2 = 13$

$3x = 13 + \mathbf{2}$

$x = \frac{\mathbf{15}}{3} = \mathbf{5}$

(b) $\frac{5x}{2} = 10$

$5x = 10 \times \mathbf{2}$

$x = \frac{\mathbf{10}}{5} = \mathbf{2}$

Chapter-8 : Ratio and Proportion

Exercise-1

1. Express the following as ratio in the simplest form :

(a) 24 cm to 4 m

1 m = 100 cm

4 m = $4 \times 100 = 400$ cm

Simplest form = $\frac{200\text{ cm}}{400\text{ cm}} = 3:50$

(b) 5 m to 1 cm

1 m = 100 cm

5 m = 5×100 cm = 500 cm

Ratio of 500 cm and 1 cm

$= \frac{500\text{ cm}}{1\text{ cm}} = 500:1$

(c) 50 p to Rs 3

1 Re = 100 p

3 Rs = 3×100 p = 300 p

Ration of 50 p and 300 paise

$= \frac{50p}{300p} = \frac{5}{30} = \frac{1}{6} = 1:6$

(d) 8 hours to 1 day

$$1 \text{ day} = 24 \text{ hours}$$

Ratio of 8 hours and 24 hours

$$\frac{8 \text{ hours}}{24 \text{ hours}} = \frac{1}{3} = 1:3$$

2. Represent the following as the ratio and write it in the simplest form :

(a) 42, 13

Ratio of 42 and 13

$$= \frac{42}{13} = 42:13$$

(b) 49, 36

Ratio of 49 and 36

$$= \frac{49}{36} = 49:36$$

(c) 36, 16

Ratio of 36 and 16

$$= \frac{36}{16} = \frac{9}{4} = 9:4$$

(d) 12, 10

Ratio of 12 and 10

$$= \frac{12}{10} = \frac{6}{5} = 6:5$$

(e) 65, 91

Ratio of 65 and 91

$$= \frac{65}{91} = \frac{5}{7} = 5:7$$

3. Which of the following is the greater :

(a) 30 : 10 or 15 : 40

$3 : 10 = \frac{3}{10}$; $\quad 15 : 40 = \frac{15}{40} = \frac{3}{8}$

Now compare $\frac{3}{10}$ and $\frac{3}{8}$

L.C.M. of 10 and 8 is 40.

So, $\frac{3}{10} = \frac{3 \times 4}{10 \times 4} = \frac{12}{40}$

$\frac{3}{8} = \frac{3 \times 5}{8 \times 5} = \frac{15}{40}$

$\frac{12}{40} < \frac{15}{40}$

$\therefore \quad \frac{3}{10} < \frac{3}{8}$ Hence, 3 : 10 < 15 : 40

15 : 40 is the greater.

(b) 4 : 11 or 17 : 30

$4 : 11 = \frac{4}{11}$; $\quad 17 : 30 = \frac{17}{30}$

Now, compare $\frac{4}{11}$ and $\frac{17}{30}$

L.C.M. of 11 and 30 is 330

So, $\frac{4}{11} = \frac{4 \times 30}{11 \times 30} = \frac{120}{330}$

$$\frac{17}{30}=\frac{17\times11}{30\times11}=\frac{187}{330}$$

$$\frac{120}{330}<\frac{187}{330}$$

$\therefore \quad \frac{4}{11}<\frac{17}{30}$ Hence 17 : 30 is greater.

4. Fill in the blanks making them equivalent ratios :

(a) $\frac{28}{40}=\frac{7}{10}=\frac{14}{20}=\frac{42}{60}$ (b) $\frac{20}{28}=\frac{5}{7}=\frac{35}{49}=\frac{70}{98}$

(c) $\frac{2}{9}=\frac{6}{27}=\frac{4}{18}$

5. Raju's father earns per month = ₹ 24,000

Raju's mother earns per month = ₹ 18,000

$$\text{Ratio of money earned} = \frac{\text{Earned by father}}{\text{Earned by mother}}$$

$$=\frac{24{,}000}{18{,}000}=\frac{24}{18}=\frac{8}{6}=\frac{4}{3}$$

Hence, the required ratio = 4 : 3

6. Number of sweets distributed between Sita and Nimmi = 40

Ratio of sweets distributed between Sita and Nimmi = 7 : 3

Let Sita get $7x$ sweets and Nimmi get $3x$ sweets

$$7x+3x=40$$

$$10x=40$$

$$x=\frac{40}{10}=4$$

$\therefore$ Sita gets sweets $= 7x = 7\times4=28$

Nimmi gets sweets $= 3x = 3\times4=12$

7. A bullock cart travels in 5 hours = 25 km

$$\text{Bullock cart travels in one hour} = \frac{25}{5}=5\text{ km}$$

Train travels in 2 hours = 100 km

$$\text{Train travels in one hour} = \frac{100}{2}=50\text{ km}$$

$$\text{The ratio of their speeds} = 5:50=\frac{5}{50}=\frac{1}{10}=1:10$$

8. The sum of two terms of the ratio = $(8+2)=10$

$$A=\frac{8}{10}\text{ of }₹\,2000$$

$$=\frac{8}{10}\times2000=₹\,1600$$

$$B=\frac{2}{10}\text{ of }₹\,2000$$

$$= \frac{2}{10} \times 2000 = ₹\ 400$$

$$A = ₹\ 1600 \text{ and } B = ₹\ 400$$

9. Length of steel tape = 10 m = 10×100 cm = 1000 cm

Breath of steel tape = $2 \cdot 4$ cm

Ratio of the length to the breadth = $1000 : 2 \cdot 4$

$$= \frac{1000}{2 \cdot 4} = \frac{10000}{24} = \frac{5000}{12} = \frac{2500}{6} = \frac{1250}{3}$$

$$= 1250 : 3$$

10. Money divided ₹ = 84,630

Raju and Sanju divided the money in ratio = 3 : 4

The sum of ratio = 3 + 4 = 7

$$\text{Raju got} = \frac{3}{7} \text{ of } 84630$$

$$= \frac{3}{7} \times 84630 = 3 \times 12090 = 36270\ ₹$$

$$\text{Sanju got} = \frac{4}{7} \text{ of } 84630 = \frac{4}{7} \times 84630$$

$$= 4 \times 12090 = 48360\ ₹$$

Hence, Raju got ₹ 36270 and Sanju got ₹ 48360

Exercise-2

1. Are the following numbers in proportion?

(a) 18, 16, 6, 12

We have, $18 : 16 = \frac{18}{16} = \frac{9}{8}$

and $6 : 12 = \frac{6}{12} = \frac{1}{2}$

So, $\frac{9}{8} \neq \frac{1}{2}$

Hence, 9, 8, 1, 2 are not in proportion.

i.e., 18, 16, 6, 12 are not in proportion.

(b) 15, 20, 30, 40

We have $15 : 20 = \frac{15}{20} = \frac{3}{4}$

and $\frac{30}{40} = \frac{3}{4}$

So, $\frac{15}{20} = \frac{30}{40}$

Hence, 15, 20, 30, 40 are in proportion.

(c) 33, 99, 51, 153

We have $33 : 99 = \frac{33}{99} = \frac{11}{33} = \frac{1}{3}$

and $\frac{51}{153} = \frac{3}{9} = \frac{1}{3}$

So, $\frac{33}{99} = \frac{51}{153}$

Hence, 33, 99, 51, 153 are in proportion.

(d) 24, 45, 18, 30

We have $24 : 45 = \frac{24}{45} = \frac{8}{15}$

$18 : 30 = \frac{18}{30} = \frac{3}{5} = \frac{3 \times 3}{5 \times 3} = \frac{9}{15}$

So, $\frac{24}{45} \neq \frac{18}{30}$

Hence, 24, 45, 18, 30 are not in proportion.

(e) 16, 64, 18, 72

We have $16 : 64 = \frac{16}{64} = \frac{2}{8} = \frac{1}{4}$

$18 : 72 = \frac{18}{72} = \frac{1}{4}$

So, $\frac{16}{64} = \frac{18}{72}$

Hence, 16, 64, 18, 72 are in proportion.

2. Find x in each of the following :

(a) $12 : 21 : : 8 : x$

As we know,

Products of extremes = Product of means

So, $12 \times x = 21 \times 8$

$\therefore \quad x = \frac{21 \times 8}{12}$

$= \frac{21 \times 2}{3} = 7 \times 2 = 14$

$x = 14$

(b) $64 : 80 : : x : 5$

As we know,

Products of extremes = Product of means

So, $64 \times 5 = 80 \times x$

$80x = 64 \times 5$

$\therefore \quad x = \frac{64 \times 5}{80} = \frac{64}{16} = 4$

$x = 4$

(c) $27 : 15 : : 36 : x$

As we know,

Product of extremes = Product of means

$27 \times x = 15 \times 36$

$$x = \frac{15 \times 36}{27} = \frac{5 \times 36}{9}$$

$$x = \frac{5 \times 36}{9} = 20$$

$$x = 20$$

(d) $x : 6 : : 55 : 11$

As we know,

Product of extremes = Product of means

$$x \times 11 = 55 \times 6$$

$$\therefore \quad x = \frac{55 \times 6}{11} = 5 \times 6 = 30$$

$$x = 30$$

3. Are the following statement true?

(a) $99 \text{ kg} : 45 \text{ kg} = ₹44 : ₹20$

We have, $99 \text{ kg} : 45 \text{ kg} = \frac{99}{45} = \frac{11}{5}$

and $₹44 : ₹20 = \frac{44}{20} = \frac{11}{5}$

So, $\frac{99 \text{ kg}}{45 \text{ kg}} = \frac{₹44}{₹20}$

Hence, this statement is true.

(b) $28 \text{ m} : 56 \text{ m} = 7 \text{ sec} : 14 \text{ sec}$

We have, $28 \text{ m} : 56 \text{ m} = \frac{28}{56} = \frac{4}{8} = \frac{1}{2}$

and, $7 \text{ sec} : 14 \text{ sec} = \frac{7}{14} = \frac{1}{2}$

Hence, this statement is true.

(c) $60 \text{ persons} : 300 \text{ persons} = ₹15 : ₹75$

We have,

$60 \text{ persons} : 300 \text{ persons} = \frac{60}{300} = \frac{6}{30} = \frac{1}{5}$

and $₹15 : ₹75 = \frac{15}{75} = \frac{1}{5}$

So, $\frac{60 \text{ persons}}{300 \text{ persons}} = \frac{₹15}{₹75}$

Hence, this statement is true.

4. Ratio of the length of Ram's string and Shyam's string = 2 : 7

Length of Shyam's string = 42 inches

Length of Ram's string = x

$\therefore \quad 2 : 7 : : x : 42$

Product of extremes = Product of means

$$2 \times 42 = 7 \times x$$

$$7x = 2 \times 42$$

$$x = \frac{2 \times 42}{7} = 2 \times 6 = 12 \text{ inches}$$

Hence, length of Ram's string is 12 inches.

5. 180 people consume wheat in a month = 720 kg

Let 150 people consume wheat in a month = x

$$180 : 720 : : 150 : x$$
$$180 \times x = 720 \times 150$$
$$x = \frac{720 \times 150}{180} = 40 \times 15 = 600 \text{ kg}$$

6. Ratio of story books to other books = 1 : 8

Total number of story books = 800

Total number of books in the library = x

$\therefore$ $1 : 8 : : 800 : x$

Product of extremes = Product of means

$$1 \times x = 8 \times 800$$
$$x = 6400$$

Hence, there are 6400 books in the library.

7. First term proportion = 8

Let second term proportion = x

Third term proportion = 6

Forth term proportion = 9

$\therefore$ $8 : x : : 6 : 9$

$$8 \times 9 = x \times 6$$

$\therefore$ $$x = \frac{8 \times 9}{6} = \frac{72}{6} = 12$$

Hence, second term proportion is 12.

8. Show that the following numbers are in continued proportion :

(a) 36, 90, 225

Product of extremes = Product of means

$$36 : 90 : : x : 225$$
$$36 \times 225 = 90 \times x$$

$\therefore$ $$x = \frac{36 \times 225}{90} = \frac{8100}{90} = 90$$

(b) 48, 60, 75

Product of extremes = Product of means

$$48 : 60 : : x : 75$$
$$48 \times 75 = x \times 60$$
$$x = \frac{48 \times 75}{60} = \frac{3600}{60} = 60$$

Exercise-3

1. Ankit saves in one month = ₹ 500

Annual saving = 12×500 = ₹ 6000

$\therefore$ Ankit's annual saving = ₹ 6000

2. Nimit can type words in 8 sec = 11

He can type words in 1 sec = $\frac{11}{8}$

2 minutes = $2 \times 60 = 120$ sec

He can type words in 2 min = $120 \times \frac{11}{8}$

$= 30 \times \frac{11}{2} = 15 \times 11 = 165$

$\therefore$ Nimit types 165 words in 2 min.

3. Cost of 15 stamps = ₹ 90

Cost of 1 stamp = $\frac{90}{15}$ = ₹ 6

Cost of 36 stamps = 6×36 = ₹ 216

$\therefore$ Cost of 36 stamps = ₹ 216

4. Cost of 40 chocolates = ₹ 320

Cost of 1 chocolate = $\frac{320}{40} = 8$

$\therefore$ Cost of 35 chocolates = 8×35 = ₹ 280

5. Rent of a room for 4 months = ₹ 4800

Rent of a room for 1 month = $\frac{4800}{4}$ = ₹ 1200

Rent of a room for a year = 1200×12 = ₹ 14400

6. Ravi earns in 10 days = Rs. 800

Ravi earns in 1 day = $\frac{800}{10}$ = Rs. 80

One month of July = 31 days

Ravi earns in the month of July = 80×31 = ₹ 2480

$\therefore$ Ravi earns = ₹ 2480

7. The weight of 45 oranges = 5 kg

Weight of 1 orange = $\frac{5}{45} = \frac{1}{9}$ kg

Total weight of 1080 oranges = $\frac{1}{9} \times 1080 = 120$ kg

8. Cost of 25 metre of cloth = ₹ 912·50

Cost of 1 metre of cloth = ₹ $\frac{912 \cdot 50}{25}$

Cost of 8 metre of cloth $= \frac{912 \cdot 50}{25} \times 8$

$= \frac{7300}{25} = 292$

$= ₹ 292$

9. 6 oil tankers can be filled by a pipe in $= 4\frac{1}{2}$ hours

1 oil tanker can be filled by a pipe in $= \frac{9}{2 \times 6} = \frac{9}{12}$ hours

4 oil tankers can be filled by a pipe $= \frac{9}{12} \times 4 = 3$ hours

10. 420 g of butter is needed to make cakes = 70

1 g of butter is needed to make cakes $= \frac{70}{420} = \frac{1}{6}$

$\therefore$ 48 g of butter is needed to make cake $= \frac{1}{6} \times 48 = 8$ cakes

11. To make 5 apple pies, Ruby required apples = 3 kg

For 1 apple pies, Ruby required apples $= \frac{3}{5}$ kg

$\therefore$ For 15 apple pies, Ruby required apples $= \frac{3}{5} \times 15 = 9$ kg

Chapter-9 : Basic Geometrical Ideas

Exercise-1

1. From the following figure name :

(a) 2 rays
AD, *AC*

(b) 1 line
BD

(c) 4 points
A, *B*, *C*, *D*

(d) 3 line segments
AC, *AB*, *AD*

2. From the given figure, find :

(a) All pairs of parallel lines.
$l \parallel m$, $l \parallel n$, $m \parallel n$, $Q \parallel P$

(b) All pairs of intersecting lines
(l, p); (m, p); (n, p); (r, l); (r, m); (r, n); (q, l); (q, n); (s, m); (s, n)

(c) Collinear points.
A, *C*, *B*; *B*, *E*, *G*; *H*, *F*, *G*; *A*, *D*, *F*; *C*, *D*, *H*

(d) Points of concurrence.
D; *G*

3. Name the lines given in the figure below :

(a) line l (b) line AB (c) line m

(d)

4. $\overline{AC}$, $\overline{AD}$, $\overline{EC}$, $\overline{EB}$ and $\overline{DB}$

5. (a) line (b) point (c) line (d) intersect, parallel

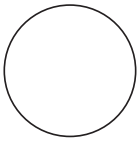
6. (a) True (b) True (c) False (d) True (e) False

Exercise-2

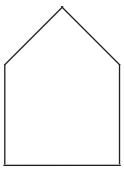
1. (a) Open (b) Closed (c) Open (d) Closed

2. **Draw the following :**

(a) A simple curve

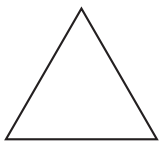


(b) A closed curve



(c) An open curve

(d) A polygon



3. **Look at the figure and find the position of following points :**

(a) Point R = exterior (b) Point J = Interior

(c) Point M = interior (d) Point N = On the boundary

(e) Point Q = Exterior

4. **Look at the figure and name the following :**

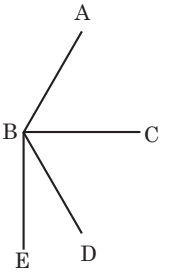
(a) The angles of the polygon
$\angle EAB$, $\angle ABC$, $\angle BCD$, $\angle CDE$, $\angle DEA$

(b) The vertices
A, B, C, D, E

(c) The diagonals of the polygon
EC, AD, AC, DB, EB

5. $\angle A$ or $\angle CAB$; $\angle C$ or $\angle DCA$; $\angle D$ or $\angle CDB$; $\angle B$ or $\angle DBA$

6. Points E, C and G lie in the interior; points B, A and J lie in exterior, point D, H and I lie on the sides



7.

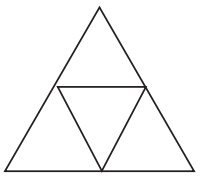
(a) $\angle ABC$, $\angle ABD$ have a common point B.
(b) $\angle ABC$, $\angle ABD$ and $\angle ABE$ have a common point B.
(c) BC is one ray in common

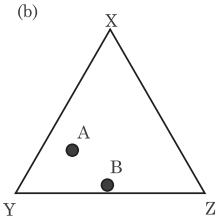
Exercise-3

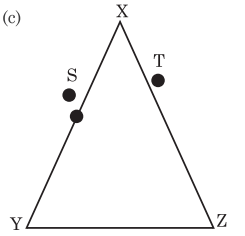
1. Name the following triangles :
(a) ΔABC (b) ΔPQR (c) ΔLMN (d) ΔLEF

2. How many triangles are there in each of the following figures? Name them :
(a) $\Delta ABC, \Delta ABD, \Delta ADC$, 3 triangles
(b) $\Delta PSU, \Delta SUT, \Delta URT, \Delta SQT, \Delta PQR$, 5 triangles
(c) $\Delta ABC, \Delta ADC, \Delta ADB, \Delta BCD, \Delta AOB, \Delta BOC, \Delta DOC, \Delta AOD$, 8 triangles

3. Draw a rough sketch of ΔXYZ and mark these points :

(a)


(b)


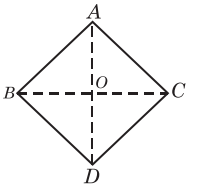
(c)


4. Fill in the blanks :
(a) 3 (b) 3 (c) 3 (d) 6

5. In the given figure, identify the vertices opposite to the sides mentioned below :
(a) N (b) L (c) M

Exercise-4

1. Draw a rough sketch of a quadrilateral *PQRS*, state :
(a) $\overline{AB}$ and $\overline{DC}$ (b) $\angle ABD$ and $\angle ACD$
(c) $\overline{BA}$ and $\overline{AC}$ (d) $\angle A$ and $\angle B$
(e) AD and BC



2. Name all the points which lie :

(a) W, Y (b) K, L, M (c) P, Q, R, S

3. Fill in the blanks :

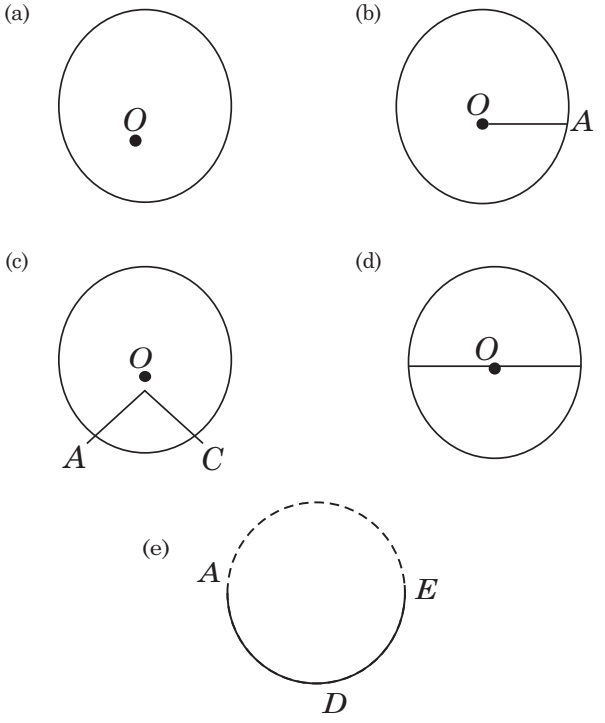
(a) two (b) adjacent (c) adjacent (d) interior, exterior, boundary,

4. $SRQT$, $SRQU$, $SQPT$, $SWPT$, $SRPT$, $SWVU$

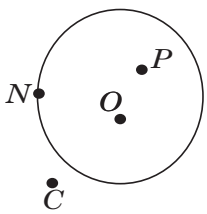
5. No, quadrilateral, as it does not satisfy its definition.

Exercise-5

1. Draw any circle and mark :



2. Draw a circle and mark three points in :



(a) Interior = P

(d) Exterior = C

(c) On the circle = N

3. In the adjoining figure, identify :

(a) Centre = O , (b) Two radii = OA, OB

(c) Two diameter = AB,CD (d) Two chords = AD, BC

(e) An arc = AFC

4. Fill in the blanks :

(a) Two (b) Longest (c) Centre

(d) Equal (e) Equidistant (f) Same centre

5. (a) Yes (b) No

6. Find the diameter of a circle when its radius is :

(a) 4 cm

Diameter of a circle = $2 \times$ radius of the circle

Radius of the circle = 4 cm

$\therefore$ Diameter of a circle = $2 \times 4 = 8$ cm

(b) 8 cm

Radius = 8 cm

$\therefore$ Diameter of the circle = $2 \times 8 = 16$ cm

(c) $7 \cdot 5$ cm

Radius = $7 \cdot 5$ cm

Diameter of the circle = $2 \times 7 \cdot 5 = 15 \cdot 0$ cm

(d) $8 \cdot 5$ cm

Radius = $8 \cdot 5$ cm

Diameter of the circle = $2 \times 8 \cdot 5 = 17 \cdot 0$ cm

7. Find the radius of a circle when its diameter is :

(a) 9 cm

Diameter = 9 cm

$$\text{Radius of a circle} = \frac{\text{Diameter of a circle}}{2} = \frac{9}{2} = 4 \cdot 5 \text{ cm}$$

(b) 18 cm

Diameter = 18 cm

$$\text{Radius of a circle} = \frac{\text{Diameter of a circle}}{2} = \frac{18}{2} = 9 \text{ cm}$$

(c) 8 cm

Diameter = 8 cm

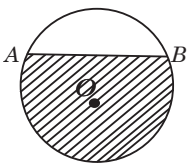
$$\text{Radius of a circle} = \frac{\text{Diameter of a circle}}{2} = \frac{8}{2} = 4 \text{ cm}$$

(d) $8 \cdot 5$ cm

Diameter = $8 \cdot 5$ cm

$$\text{Radius of a circle} = \frac{\text{Diameter of a circle}}{2} = \frac{8 \cdot 5}{2} = \frac{85}{20} = 4 \cdot 25 \text{ cm}$$

8.



9. Circumference of the cake

10. Diameter of a circle = 10 cm

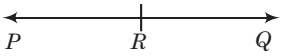
$$\text{Radius of circle} = \frac{\text{Diameter of a circle}}{2}$$

$$= \frac{10}{2} = 5 \text{ cm}$$

Chapter-10 : Understanding Elementary Shapes

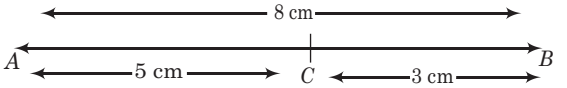
Exercise-1

1.



Yes, $PQ = PR + RQ$

2.



point C lies between A and B.

3. N is the mid-point of line segment JQ?

Yes, $\overline{JN} = \overline{NR}$

4. Write the lengths of the following line segments in the descending order :

$GH < EF < AB < CD$

5. Name the vertex and arms of the following angles :

(a) Vertex O; Arms OA and OB

(b) Vertex D; arms DE and DF

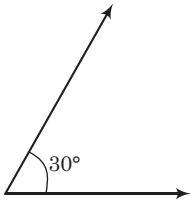
6. What kind of angles are formed in the given figure :

(a) Right angle (b) Acute angle

(c) Obtuse angle (d) Straight angle

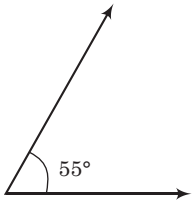
7. Draw and classify the following angles :

(a) 30° Acute angle

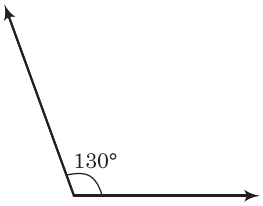


(b) Zero

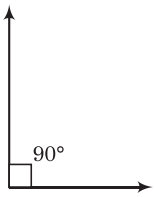
(c) 55° Acute angle



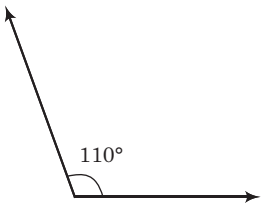
(d) 130° Obtuse angle



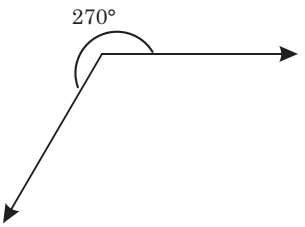
(e) 90° Right angle



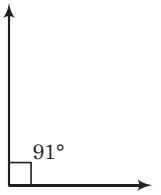
(f) 110° Obtuse angle



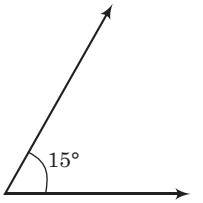
(g) 270°
Reflex angle



(h) 91°
Obtuse angle



(i) 15°
Acute angle



8. How many degrees are there in :

(a) 360° (b) 180° (c) 135°

9. Where will the hand of a clock stop if :

(a) 9 O′ clock (b) 9 O′ clock (c) 9 O′ clock (d) 2 O′ clock

10. What fraction of revolution does the hour hand of a clock turn through, when it goes from :

(a) 3 to 9 $= \frac{1}{2}$ revolution (b) 1 to 10 $= \frac{3}{4}$ revolution

(c) 4 to 7 $= \frac{1}{4}$ revolution (d) 6 to 12 $= \frac{1}{2}$ revolution

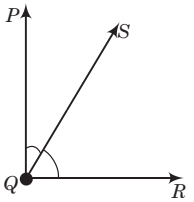
(e) 7 to10 $= \frac{1}{4}$ revolution

11. Suppose you are facing the north direction. Name the direction you will face if you turn to right through :

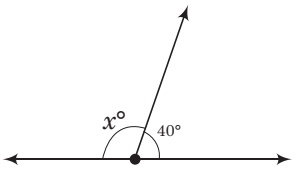
(a) East (b) South

12. 14 right angles

13.



14. Find the unknown angle in the following figures :



(a) $x + 40° = 180°$; $x = 180° - 40° = 140°$

(b) $x° + 60° = 90°$; $x = 90° - 60° = 30°$; $x = 30°$

(c) $60° + x° = 180°$; $x = 180° - 60° = 120°$;

(d) $110° + x° = 180°$; $x = 180° - 110° = 70°$ $x° = 70°$

15. How many right angles do you make if you start facing :

(a) 4 right angles (b) 2 right angles (c) 3 right angles

Exercise-2

1. Classify the following triangles on the basis of sides :

(a) Equilateral triangle (b) Scalene triangle

(c) Isosceles triangle (d) Scalene triangle

2. Classify the following triangles on the basis of angles :

(a) Acute angled triangle (b) Obtuse angled triangle

(c) Right angled triangle (d) Right angled triangle

3. Classify the following triangles :

(a) Acute angled triangle (b) Equilateral and acute angled triangle

(c) Obtuse angled triangle (d) Scalene

(e) Scalene

4. Fill in the blanks :

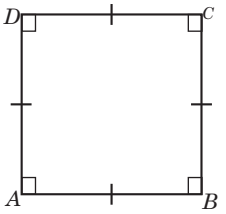
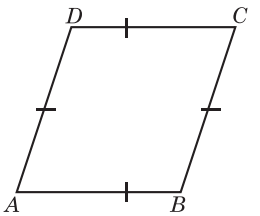
(a) 60° (b) Equilateral triangle (c) Right angled triangle

(d) Equilateral triangle

Exercise-3

1. A quadrilateral is a polygon having four sides. It can also be defined as a simple closed figure bounded by four line segments. The adjoining figure is quadrilateral *ABCD*. Some special types of quadrilaterals are trapezium, parallelogram, rhombus and square.

2.

S.No.	Square	Rhombus
1.		
2.	A square is a parallelogram whose all the sides are equal and each angle is a right angle.	A rhombus is a parallelogram in which all the sides are equal.
3.	In quadrilateral *ABCD*, $\angle A = \angle B = \angle C = \angle D = 90°$ and $AB = BC = CD = DA$	In quadrilateral *ABCD* all sides are of equal length i.e. $AB = BC = CD = DA$

3. State whether the following statements are true or false :

(a) True (c) False (b) False (d) True (e) False

4. Write any two properties of following :

(a) Rectangle

(i) A rectangle is a parallelogram in which each angle is a right angle.

(ii) In quadrilateral *ABCD*, $\angle A = \angle B = \angle C = \angle D = 90°$

(b) Parallelogram

(i) Parallelogram is a quadrilateral in which both pairs of opposite sides are parallel.

(ii) In quadrilateral $ABCD$ opposite sides are parallel, *i.e.* $AB \parallel DC$.

Exercise-4

1. What is the shape of :

(a) Cuboid (b) Sphere (c) Cube

(d) Cuboid (e) Cylinder (f) Cone

2. Give three examples from your surrounding which are in the shape of :

(a) Cylinder = glass, pens and toilet paper roll

(b) Cube = dice, ice cube

(c) Cuboid = pencil box, house brick, shoe box

(d) Cone = ice-cream, tent, joker cap

3. Fill in the blanks :

(a) Length, breadth , height (b) Height (c) Triangular, eight

(d) Cylinder (e) Sides of the base

4. Yes, all our books, geometry box etc. are a cuboid or a cube.

Chapter-11 : Mensuration

Exercise-1

1. Find the perimeter of the following figures :

(a) Perimeter of a rectangle $= 2\,(l + b)$

$l = 7, \quad b = 2$

Perimeter of a rectangle $= 2\,(7 + 2) = 2 \times 9 = 18$ cm

(b) Perimeter $= 4 + 4 + 3 = 11$ cm

(c) Perimeter $= 3 + 2 + 2 + 7 + 5 = 19$ cm

(d) Perimeter $= 6 + 3 + 4 + 8 + 4 = 25$ cm

(e) Perimeter $= 20 + 10 + 20 + 10 = 60$ cm

(f) Perimeter $= 3 + 2 + 1 + 9 + 9 + 1 + 2 = 27$ cm

2. Find the missing length :

(i) Perimeter $= 30$ cm

$30 \text{ cm} = 10 \text{ cm} + 12 \text{ cm} + x$

or $30 = 22 + x$

$\therefore \quad x = 30 - 22 = 8$ cm

(ii) Perimeter $= 51$ cm

$51\text{cm} = 13 \text{ cm} + 2 \text{ cm} + 15 \text{ cm} + x$

$51 = 30 + x$

$\therefore \quad x = 51 - 30 = 21$ cm

3. Find the perimeter of the rectangle :

(a) $L = 20$ cm, $B = 14$ cm

Perimeter of rectangle $= 2\,(l + b)$

$= 2\,(20 + 14)$

$= 2 \times 34 = 68$ cm

(b) $L = 16$ cm , $B = 3 \cdot 2$ cm

Perimeter of the rectangle $= 2\,(l + b)$

$= 2\,(16 + 3 \cdot 2)$

$= 2 \times 19 \cdot 2 = 38 \cdot 4$ cm

(c) $L = 11$ m 25 cm, $B = 16$ cm

$= 2\,(11 \cdot 25 + 0 \cdot 16)$

$= 2\,(11 \cdot 41)$

$= 22 \cdot 82$ cm

4. Find the perimeter of square :

(a) Side $= 14$ cm

Perimeter of square $= 4 \times$ Length of a side

$= 4 \times 14 = 56$ cm

(b) Side $= 2 \cdot 3$ m

Perimeter of square $= 4 \times$ length of a side

$= 4 \times 2 \cdot 3$

$= 9 \cdot 2$ m

(c) Side of a pentagon $= 4 \times$ length of a side

$= 4 \times 24 \cdot 5$

$= 98 \cdot 0$ m

5. Side of a pentagon $= 120$ m

Perimeter of a pentagon = No. of sides × length of each side

$= 5 \times 120 = 600$ m

Distances covered by a man $= 2 \times 600$

$= 1200$ m

6. Perimeter of a triangle $= 64$ cm

One side $= 23$ cm

Other side $= 10$ cm

Let third side $= x$

$64 = 23 + 10 + x$

$64 = 33 + x$

$x = 64 - 33 = 31$ cm

7. Side of a square field $= 28$ m

Total length of the barbed wire required to fence the field = Perimeter of a square $= 4 \times$ side

$= 4 \times 28 \quad = 112$ m

Hence, 112 m total length of the barbed wire required to fence the field.

8. Side of a chess-board $= 26$ cm

Perimeter of the chess board $= 4 \times$ side

$= 4 \times 26 = 104$ cm

9. Square park has side $= 50$ m

Distance covered by Payal

$= 2 \times$ Perimeter of the square park

$= 2 \times 4 \times 50$

$$= 2 \times 200 = 400 \text{ m}$$

Distance covered by Tanu = 3 × perimeter of a rectangular park

Length = 100 m, breadth = 75 m

$$= 3 \times 2 (l + b)$$
$$= 3 \times 2 (100 + 75)$$
$$= 3 \times 2 \times 175$$
$$= 6 \times 175 = 1{,}050 \text{ m}$$

Hence, Tanu covers more distance.

10. Perimeter of a rectangular field = 200 m

Length = 62 m

Breadth = x

Perimeter of a rectangular field = $2 (l + b)$

$$200 \text{ m} = 2 (62 + x)$$
$$200 = 2 \times 62 + 2x$$
$$200 = 124 + 2x$$
$$2x = 200 - 124$$
$$2x = 76$$
$$x = \frac{76}{2} = 38 \text{ m}$$

Hence, breadth of the rectangular field is 38 m.

11. Rate of construction of boundary wall = Rs. 200 per metre

Total cost construction = ₹ 20,000

$$\text{Dimensions} = \frac{1}{4} \times \frac{20{,}000}{200}$$
$$= \frac{1}{4} \times 100 = 25 \text{ metre side}$$

12. Ratio of length and breadth of a basketball court = 7 : 3

Perimeter of a court = 200 m

Perimeter of a court = $2 (l + b)$, taking $l = 7x$, $b = 3x$

$$200 = 2 (7x + 3x)$$
$$200 = 2 \times 10x$$
$$200 = 20x$$
$$x = 10 \text{ m}$$

Length of basketball court = $7x = 7 \times 10 = 70$ m

Breadth of basketball court = $3x = 3 \times 10 = 30$ m

13. Breadth = 53 · 5 cm

$$\text{Length} = 2 \times \text{breadth} = 2 \times 53 \cdot 5$$
$$= 107 \text{ cm}$$

Perimeter of the rectangle = $2 (l + b)$

$$= 2 (107 + 53 \cdot 5)$$
$$= 2 \times (160 \cdot 5) = 321 \text{ cm}$$

14. Length = 4 m

Breadth = 3 cm = 0·03 m

Perimeter of a frame = $2(l + b)$

$= 2(4 + 0 \cdot 03)$

$= 2 \times 4 \cdot 03 = 8 \cdot 06$ m

Length of wood Niti needs to make for the frame = $10 \times$ (Perimeter of a frame)

$= 10 \times 8 \cdot 06 = 80 \cdot 6$ m

15. Find the perimeter :

(a) A triangle with 5 cm, 6 cm, 7 cm

Perimeter of triangle = $5 + 6 + 7 = 18$ cm

(b) An equilateral of side 6 cm

Perimeter of a triangle = $6 + 6 + 6 = 18$ cm

Exercise-2

1. Find the area of rectangles with dimensions :

(a) $l = 14$ m 25 cm, $b = 2$ cm 30 cm

$$1 \text{ cm} = \frac{1}{100} \text{ m}$$

$$l = 14 \text{ m} + 25 \times \frac{1}{100} \text{ m} = 14 + \frac{1}{4} = \frac{57}{4} \text{ m}, \; b = 2 + \frac{3}{10} = \frac{20+3}{10} = \frac{23}{10} \text{ m}$$

Area of rectangle = $l \times b$

$$= \frac{57}{4} \times \frac{23}{10} = \frac{1311}{40} = 32 \cdot 775 \text{ cm}^2$$

(b) $l = 30$ m, $b = 7 \cdot 5$ m

Area of rectangle = $l \times b$

$= 30 \times 7 \cdot 5 = 225$ sq.m

(c) $l = 50$ cm, $b = 12 \cdot 5$ cm

Area of rectangle = $l \times b$

$= 50 \times 12 \cdot 5$

$= 625$ sq. cm

2. Find the area of square each of whose side is :

(a) 13 cm

Area of square = side × side

$= 13 \times 13 = 169$ sq. cm

(b) $14 \cdot 2$ cm

Area of square = side × side

$= 14 \cdot 2 \times 14 \cdot 2$ sq. cm

$= 201 \cdot 64$ sq. cm

(c) 2m 15cm

1 m = 100 cm

$2 \text{ m} = 2 \times 100 = 200$ cm

200 cm + 15 cm = 215 cm

Area of square = side × side

$= 215 \times 215$ sq. cm.

$= 46225$ sq. cm.

(d) $3 \cdot 6$ m

Area of square = side × side

$= 3 \cdot 6 \times 3 \cdot 6$ sq.cm

$= 12 \cdot 96$ sq. cm

3. Length = ?

Breadth = 12 cm

Area of rectangle = 204 sq. cm

Area of a rectangle = $l \times b$

$204 = l \times 12$

$12l = 204$

$\therefore$ Length, $l = \frac{204}{12} = 17$ cm

4. Area of rectangle = 1728 sq. cm

Length = 12 cm

Breadth = ?

Area of rectangle = $l \times b$

$1728 = 12 \times b$

$b = \frac{1728}{12} = 144$ cm

5. We know that the total area of paper sheet must be equal to the area of envelope

Length of the paper sheet = 300

Breadth of the paper sheet = 150 cm

Area of the paper sheet = $l \times b$

$= 300 \times 150$

$= 45000$ sq. cm

Area of an envelope = $l \times b$

Length of envelop = 10 cm

Breadth of envelope = 3 cm

Area of an envelope = $10 \times 3 = 30$ sq. cm

$\therefore$ No. of envelopes = $\frac{\text{Area of the paper sheet}}{\text{Area of an envelope}}$

$= \frac{45000}{30} = \frac{4500}{3} = 1500$ envelopes

6. Perimeter of a square = 48 cm

Perimeter of a square = 4 × length of a side

$48 = 4 \times x$

$x = \frac{48}{4} = 12$

Length of a side = 12 cm

Area of square = side × side

$= 12 \times 12 = 144$ sq. cm

7. Length of a rectangular field = 352 cm

Area of the rectangular field = 30976 cm^2

Let breadth of the rectangular field = x

$$30976 = 352 \times x$$

$$x = \frac{30976}{352} = 88$$

Breadth of rectangular field = 88 cm

Perimeter of a rectangular field = $2(l + b)$

$= 2(352 + 88)$

$= 2(440)$

$= 880$ cm

8. We know that the total area of tiles must be equal to the area of floor

Length of the floor = 7 m = 700 cm

Breadth of the floor = 6 m 30 cm = (600 + 30) cm

$= 630$ cm

Area of the floor = $l \times b$

$= 700 \times 630$

$= 441{,}000$ sq. cm

Area of a tile = $30 \times 25 = 750$ sq. cm

$$\therefore \quad \text{No. of tiles required} = \frac{\text{Area of the floor}}{\text{Area of a tile}} = \frac{441000}{750} = 588 \text{ tiles}$$

9. We know that carpet needed to cover the floor of the room is equal to the area of room.

Length of the room = 5 m 40 cm

$= 500 + 40 = 540$ cm

Width of the room = 4 m 70 cm

$= 400 + 70 = 470$ cm

Area of the room = length × width

$= 540 \times 470$

$= 253800$ sq. cm

$= 25 \cdot 38$ sq. m

10. Length of a rectangle = 80 m

$$\text{Breadth of the rectangle} = \frac{3}{4} \times \text{length}$$

$$= \frac{3}{4} \times 80 \text{ m} = 60 \text{ m}$$

$\therefore$ Area of the rectangle = $80 \times 60 = 4800$ sq. cm

11. (a) When side is doubled the area of square will become

4 times

(b) When length and breadth are doubled, the area of rectangle will become

4 times

Chapter-12 : Data Handling

Exercise-1

1. 1, 3, 4, 4, 6, 8, 10, 12

2. Students of a class were tested to find their pulse rate. The following were obtained for the number of beats per minute.

No. of beats per minute	Tally marks	Frequency
60	|||	3
62	|	1
67	|	1
68	|	1
70	|||	3
71	||	2
73	||	2
	Total	13

3. In a study of number of accidents per day, the observations for 20 days were obtained as follows.

No. of accidents per day	Tally marks	Frequency
0	|	1
1	||	2
2	𝍸	5
3	||	2
4	||||	4
5	|||	3
6	|||	3
	Total	20

4. The following data shows the shoes of various sizes at a shop on a particular day.

Size of shoes	Tally marks	Frequency
4	𝍸 |	6
5	𝍸 |	6
6	𝍸 |	6
7	𝍸	5
8	𝍸	5
	Total	28

(a) What is the range of shoe size?

4

(b) Which shoe size has the highest frequency?
4, 5 and 6

5. (a) 30, 39, 40, 42, 45, 50, 51, 53, 55. 63, 64, 65, 68, 72, 77, 78, 79, 85, 87, 90
(b) 30 (c) 90 (d) 60

Exercise-2

1. The following pictograph shows the number of flowers grown in a farm during a week.
(a) 300 flowers (b) Wednesday (c) 20

2. The pictograph given below shows how many letters were collected from a post box on each of the day in a certain week :
(a) Friday (b) 135 (c) 25 (d) Thursday

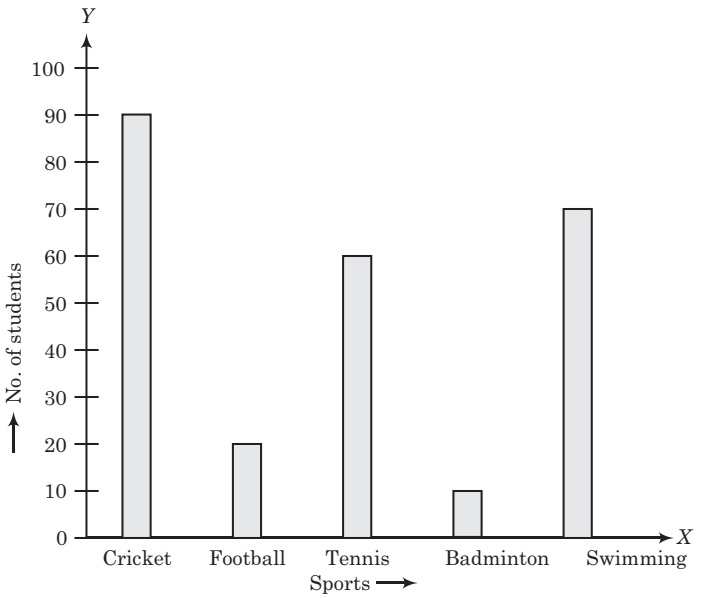
3. The following pictograph gives details of 30 students who like different types of food.
(a) Pizza (b) 8 (c) 2

4. Given below is data relating to the sale of computers in a shop in six months.
= 5 computer

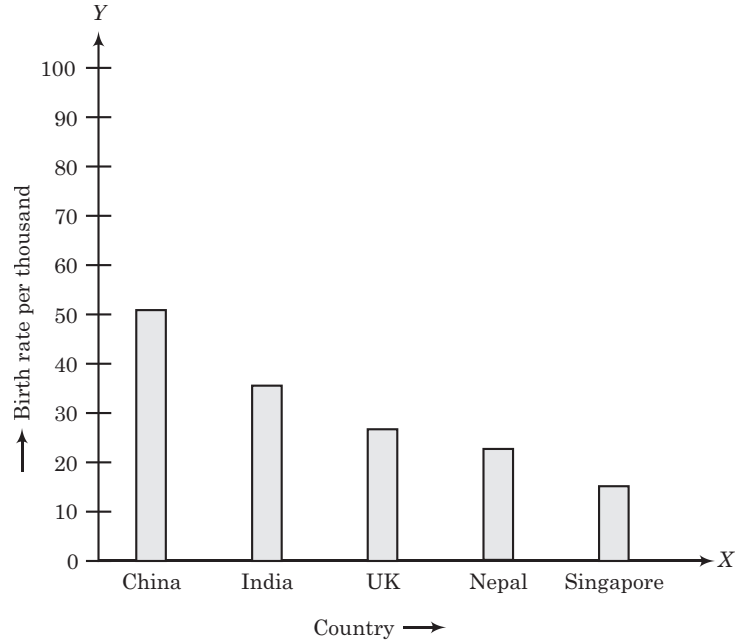
Month	No. of computers sold
January	100
February	150
March	95
April	50
May	120
June	200

Exercise-3

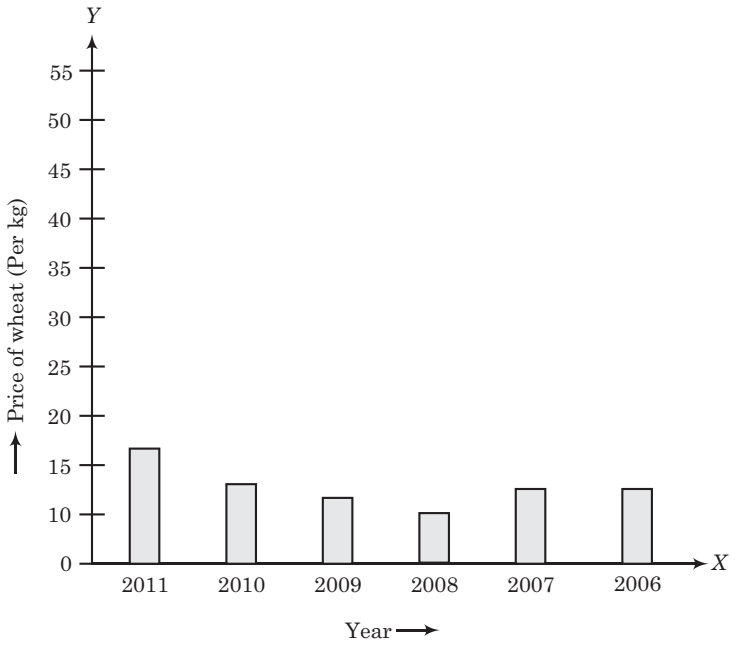
1. The following table shows the favourite sports of 250 students of a school. Represent the data by bar graph.



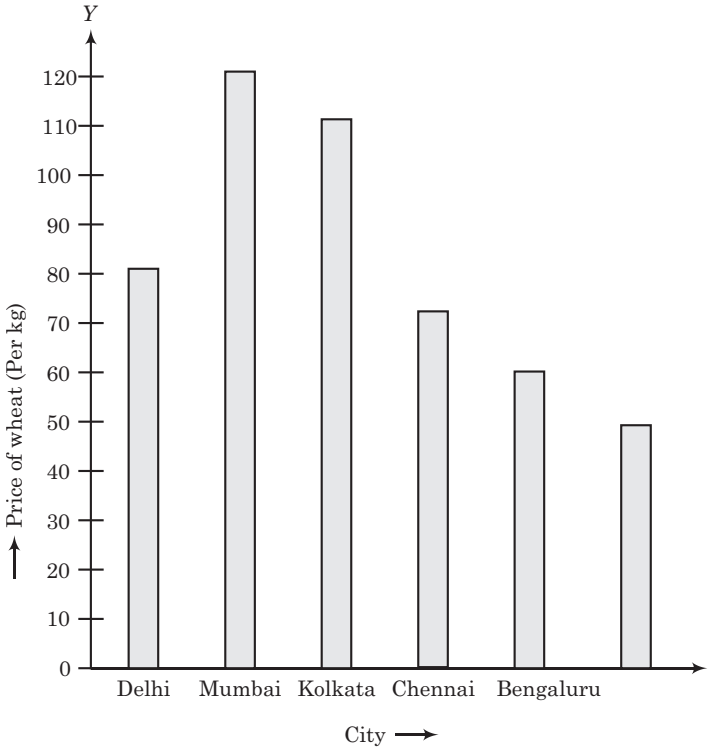
2. The birth rate in five countries over a period of time is shown below. Represent the data by bar graph.



3. The following data shows the price of wheat during the last six years. Represent the data in the form of a bar graph.



4. Study the population of various cities at a certain period of time.



(a) Mumbai

(b) Total population = $80 + 120 + 110 + 70 + 60 + 50 = 490$
$= 4$ crore 90 lakhs

(c) Two cities have a population of more than 1 crore (d) 70 lakhs

5. Study the bar graph and answer the following questions :

(a) Total toys = $2 + 3 + 4 + 5 + 6 = 20$
$= 20 \times 1000 = 20000$ toys

(b) June production = 4000
May production = 3000
Increase in production = $4000 - 3000 = 1000$

(c) Minimum production = in April
Maximum production = in August

6. Read the bar graph carefully and answer the following questions :

(a) The bar graph gives the information about marks obtained by a student in different subjects.

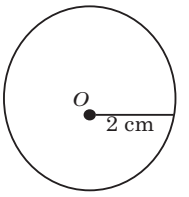
(b) Mathematics (c) Hindi : 45

Chapter-13 : Practical geometry

Exercise-1

1. (a) Radius = 2 cm

Let us draw a circle of radius 2 cm with the compass.



(i) Mark a point O on a drawing sheet as the centre of the circle.

(ii) Now, open the arms of compass for the required radius of 2 cm. Place the pointed tip of the compass on the zero mark of the ruler.

(iii) Now, adjust the pencil end of the compass in such a way that the pencil tip touches the 2 cm mark.

(iv) Place the pointed tip on point O, and rotate the pencil head around the centre point.

(v) The circle with centre O is the required circle with radius 2 cm.

(b) Radius = 4.5 cm

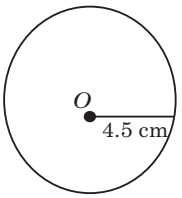
Let us draw a circle of radius 4.5 cm with the compass.

(i) Mark a point O on a drawing sheet as the centre of the circle.

(ii) Now, open the arms of compass for the required radius of 4.5 cm. Place pointed tip of the compass on the zero mark of the ruler.

(iii) Now, adjust the pencil end of the compass in such a way that the pencil tip touches the 4.5 cm mark.

(iv) Place the pointed tip on point O, and rotate the pencil head around the centre point.

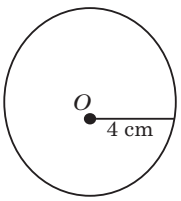


(v) The circle with centre O is the required circle with radius 4.5 cm.

2. Diameter = 8 cm

$$\text{Radius} = \frac{8}{2} = 4 \text{ cm}$$

Let us draw a circle of radius 4 cm with the compass.



(i) Mark a point O on a drawing sheet as the centre of the circle.

(ii) Now, open the arms of compass for the required radius of 4 cm. Place the pointed tip of the compass on the zero mark of the ruler.

(iii) Now, adjust the pencil end of the compass in such a way that the pencil tip touches the 4 cm mark.

(iv) Place the pointed tip on point O, and rotate the pencil head around the centre point.

(v) The circle with centre O is the required circle with radius 4 cm.

3. Let us draw a circle of radius $4 \cdot 5$ cm with the compass.

(i) Mark a point O on a drawing sheet as the centre of the circle.

(ii) Now, open the arms of compass for the required radius of $4 \cdot 5$ cm. Place the pointed tip of the compass on the zero mark of the ruler.

(iii) Now, adjust the pencil end of the compass in such a way that the pencil tip touches the $4 \cdot 5$ cm mark.

(iv) Place the pointed tip on point O and rotate the pencil head around the centre point.

(v) The circle with centre O is the required circle with radius $4 \cdot 5$ cm.

(vi) Draw a circle of radius $3 \cdot 5$ cm with the compass and use above process to make circle with the same centre O.

(vii) And then take radius $2 \cdot 5$ cm with the compass and make a circle with the in same centre O.

4. Let us draw line $PQ = 6$ cm and then draw a circle of radius 3 cm with the compass, taking P as a centre

(i) Mark a point P on a drawing sheet as the centre of the circle.

(ii) Now, open the arms of compass for the required radius of 3 cm. Place the pointed tip of the compass on the zero mark of the ruler.

(iii) Now, adjust the pencil end of the compass in such a way that the pencil tip touches the 3 cm mark.

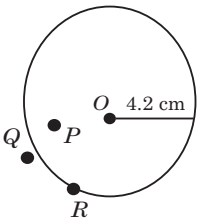
(iv) Place the pointed tip on point P, and rotate the pencil head around the centre point.

(v) The circle with centre P is the required circle with radius 3 cm.

(vi) Draw another circle with the centre Q with the radius 3 cm.

(vii) The circle with centre Q is the required circle with radius 3 cm.

5. Let us draw a circle of radius $4 \cdot 2$ cm with the compass.



(i) Mark a point O on a drawing sheet as the centre of the circle.

(ii) Now, open the arms of compass for the required radius of $4 \cdot 2$ cm. Place the pointed tip of the compass on the zero mark of the ruler.

(iii) Now, adjust the pencil end of the compass in such a way that the pencil tip touches the $4 \cdot 2$ cm mark.

(iv) Place the pointed tip on point O, and rotate the pencil head around the centre point.

(v) The circle with centre O is the required circle with radius $4 \cdot 2$ cm.

(vi) Show P is in the interior of the circle.

(vii) Show Q is in the exterior of the circle.

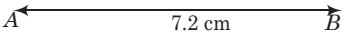
(viii) Show R is on the circle.

6. Construction as same as ques 4.

Exercise-2

1. (i) Draw a line l and mark a point A on it.

(ii) With A as centre, draw a line $AB = 7 \cdot 2$ cm with the help of ruler.

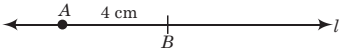


(iii) $\overline{AB}$ is the required line segment.

2. (a) Length = 4 cm

(i) Draw a line l and mark a point A on it.

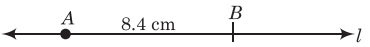
(ii) With A as centre and radius 4 cm *i.e.* draw an arc cutting l at B.



(iii) $\overline{AB}$ is the required line segment.

(b) Length = $8 \cdot 4$ cm

(i) Draw a line l and mark a point A on it.

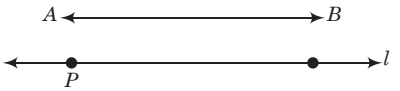


(ii) With A as centre and radius $8 \cdot 4$ cm *i.e.* draw an arc cutting l at B.

(iii) $\overline{AB}$ is the required line segment.

3. Let us construct a line segment without measuring line segment $\overline{AB}$.

(i) Given $\overline{AB}$ whose length is not known.



(ii) Draw a line l and take a point P on it.

(iii) With P as centre and radius equal to $\overline{AB}$ *i.e.* draw an arc cutting l at Q.

(iv) $\overline{PQ}$ is the required copy of a line segment *i.e.* $\overline{PQ} = \overline{AB}$

4. We have $\overline{PQ} = 4 \cdot 5$ cm

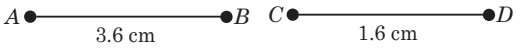
Draw a line l and take a point A on it.

(i) With A as centre and radius equal to $AB = 2PQ$ *i.e.* draw an arc of $2 \times 405 = 9$ cm cutting l at B.

(ii) $\overline{AB}$ is the required copy of a line segment *i.e.* $\overline{AB} = 2\,\overline{PQ}$

5. **(a)** $\overline{PQ} = \overline{AB} - \overline{CD}$

We have $\overline{AB} = 3 \cdot 6$ and $\overline{CD} = 1 \cdot 6$ cm.



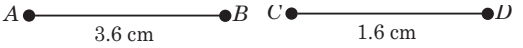
To construct a line segment whose length is $\overline{AB} - \overline{CD} = 2 \cdot 0$ cm, undertake the following steps :

(i) Draw a line l and take a point.

(ii) Construct a line segment PM such that $\overline{PM} = \overline{AB}$

(iii) Construct another line segment MQ on l such that $\overline{MQ} = \overline{CD}$ but in opposite direction such that point Q lies between points P and M. Then $\overline{PQ} = \overline{PM} - \overline{MQ}$ is the required line segment.

(b) $\overline{PQ} = \overline{AB} + \overline{CD}$



We have $\overline{AB} = 3 \cdot 6$ and $\overline{CD} = 1 \cdot 6$ cm

To construct a line segment whose length is $\overline{AB} + \overline{CD} = 3 \cdot 6 + 1 \cdot 6 = 5 \cdot 2$ cm, undertake the following steps :

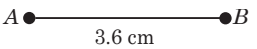
(i) Draw a line l and take a point P on it.

(ii) Construct a line segment $\overline{PQ} = \overline{AB} + \overline{CD}$

$= 3 \cdot 6 + 1 \cdot 6 = 5 \cdot 2$ cm

Then $\overline{PQ} = \overline{AB} + \overline{CD}$ is the required line segment.

(c) $\overline{PQ} = 2\,\overline{AB}$



We have $AB = 3 \cdot 6$ cm

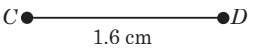
To construct a line segment $\overline{PQ} = 2\,\overline{AB} = 2 \times 3 \cdot 6 = 7 \cdot 2$ cm

(i) Draw a line l and the a point P on it.

(ii) Construct a line segment $\overline{PQ}$ such that $\overline{PQ} = 2\,\overline{AB}$.

Then $\overline{PQ} = 2\,AB$ is the required line segment.

(d) $\overline{PQ} = 3\,\overline{CD}$



We have $\overline{CD} = 1 \cdot 6$ cm

To construct a line segment whose length is $\overline{PQ} = 3\,\overline{CD} = 3 \times 1 \cdot 6 = 4 \cdot 8$ cm, undertake the following steps :

(i) Draw a line l and take a point P on it.

(ii) Construct a line segment PM such that $\overline{PM} = \overline{CD}$.

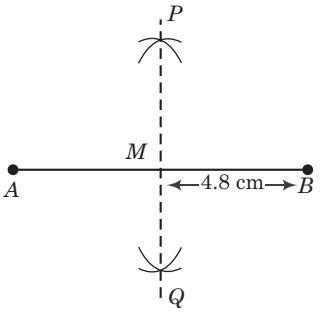
(iii) Construct another line segments MS in SQ on the same line l such that $\overline{PQ} = 3\,\overline{CD}$

$3 \times 3 \cdot 6 = 10 \cdot 8$ cm.

Then $\overline{PQ} = 3\,\overline{CD}$ is the required line segment.

Exercise-3

1. Draw a line segment AB equal to $4 \cdot 8$ cm. Construct the perpendicular bisector of AB.



Solution : Let us draw perpendicular bisector $\overline{AB}$ which is equal to $4 \cdot 8$ cm

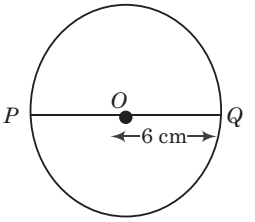
(a) Draw a line segment AB of length $4 \cdot 8$ cm.

(b) With point A as centre and radius more than half the length of $\overline{AB}$, draw arcs above and below AB using a compass.

(c) With B as centre and with the same radius as that in step (b), draw arcs cutting the previous arcs at points P and Q respectively.

(d) Join points P and Q, line segment PQ that intersects $\overline{AB}$ at M is the required perpendicular bisector of $\overline{AB}$.

2. Draw a circle of radius 6 cm. Draw its diameter and name it PQ. Using compass and ruler, construct the perpendicular bisector of PQ. Does it pass through the centre of the circle



Solution : Let us draw a circle of radius 6 cm with the compass.

(a) Mark a point O on a drawing sheet as the centre of the circle.

(b) Now, open the arms of compass for the required radius of 6 cm. Place the pointed tip of the compass on the zero mark of the ruler.

(c) Now, adjust the pencil end of the compass in such a way that the pencil tip touches the 6 cm mark.

(d) Place the pointed tip on point O and rotate the pencil head around the centre point.

(e) The circle with centre O is the required circle with radius 6 cm.

(f) The diameter of the circle $d = 2r = 2 \times 6 = 12$ cm, draw diameter of circle, which is PQ.

3. Draw a circle with centre O and radius $3 \cdot 5$ cm. Draw a chord $\overline{PQ}$. Construct the perpendicular bisector of $\overline{PQ}$ and check whether it passes through centre O.

Solution : Let us draw a circle of radius $3 \cdot 5$ cm with the compass.

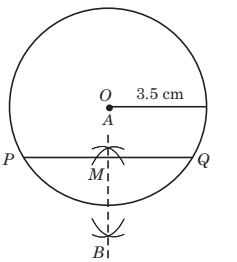
(a) Mark a point O on a drawing sheet as the centre of the circle.

(b) Now, open the arms of compass for the riquired radius of $3 \cdot 5$ cm. Place the pointed tip of the compass on the zero mark of the ruler.

(c) Now, adjust the pencil end of the compass in such a way that the pencil tip touches the $3 \cdot 5$ cm mark.sss

(d) Place the pointed tip on point O, and rotate the pencil head around the centre point.

(e) The circle with centre O is the required circle with radius $3 \cdot 5$ cm.



(f) Now, mark the points P and Q. Join points P and Q. $\overline{PQ}$ is the required chord.

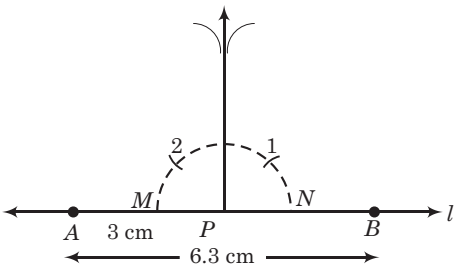
(g) Let us draw perpendicular bisector of $\overline{PQ}$.

(h) With point P as centre and radius more than half the length of $\overline{PQ}$, draw arcs above and below PQ using a compass.

(i) With Q as centre and with the same radius as that in step (b) draw arcs cutting the previous arcs at points A and B respectively.

(j) Join points A and B line segment AB that intersects $\overline{PQ}$ at M is the required perpendicular bisector of $\overline{PQ}$.

4. Draw a line segment AB of length $6 \cdot 3$ cm. Take a point P on $\overline{AB}$ such that $AP = 3$ cm. Draw $PS \perp AB$.



Solution : Let us draw a line l and mark a point A on it.

(a) With A as centre and radius $6 \cdot 3$ cm. draw an arc cutting l at B.

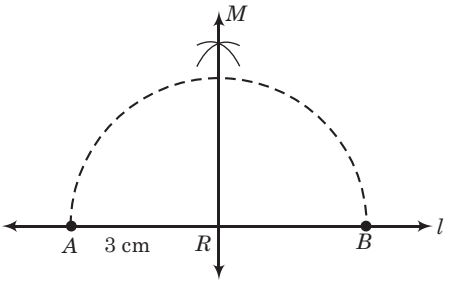
(b) $\overline{AB}$ is the required line segment.

(c) With point A as centre, cut an arc of 3 cm to get a point P on line l.

(d) Now at point P draw the perpendicular PS on AB with the help of compass and ruler.

(e) PS is the required perpendiclar to AB.

5. Draw a line l. Take a point R on it. Draw a line RM perpendicular to l using compass and ruler.



Solution : Let us draw a perpendicular on line l from a given point R on the line.

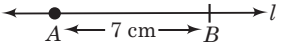
(a) With R as centre and any radius, draw an arc intersecting line l at points A and B on opposite sides of R.

(b) With 'A' as centre and radius more that half of $\overline{AB}$ *i.e.* more than $\overline{AR}$ draw an arc.

(c) With B as centre and radius as in above step, draw another arc intersecting the previous arc at M.

(d) Join RM, then RM is the required perpendicular to l.

6. Draw a line segment AB equal to 7 cm. Using ruler and compass, obtain a line segment of length $\frac{1}{2} AB$. Measure each part.



Solution :

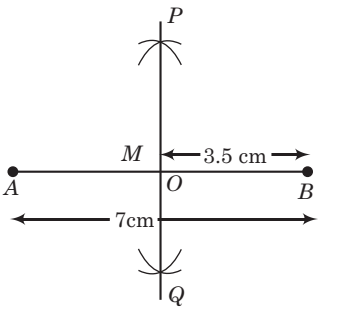
(i) Draw a line l and mark a point A on it.

(ii) With A as centre and radius 7 cm i.e. draw an arc cutting l at B.

(iii) $\overline{AB}$ is the required line segment.

(iv) With point A as centre and radius more than half the length of $\overline{AB}$, draw arcs above and below AB using a compass.

(v) With B as centre and with the same radius as that in step (b), draw arcs cutting the previous arcs at points P and Q respectively.



(vi) Join points P and Q. Line segment PQ so obtained is the perpendicular bisector of AB.

(vii) Thus $AB = 7$ cm, $\frac{1}{2}AB = \frac{7}{2} = 3 \cdot 5$ cm,

i.e. $AO = OB = 3 \cdot 5$ cm

Exercise-4

1. Construct the following angles by using ruler and compass.

(a) 45°

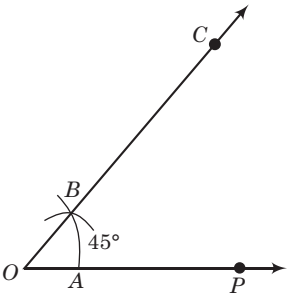
(i) Draw a ray OP.

(ii) With O as centre and a convenient radius, draw an arc intersecting $\overrightarrow{OP}$ at A.

(iii) With A as centre and the same radius draw another arc intersecting the previous arc at B.

(iv) Join OB and extend it to Q.

Hence $\angle QOP = 45°$ is the required angle.



(b) 90°

Steps of construction

(i) Draw a ray OP.

(ii) With O as centre and a convenient radius, draw an arc cutting $\overrightarrow{OP}$ at A

(iii) With A as centre and the same radius, as in step (ii) cut the first arc at B.

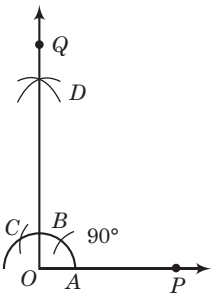
(iv) With B as centre and the same radius, cut again the first arc at C.

(v) With B as centre and the same radius more than half BC, draw an arc opposite to.

(vi) With C as centre and the same radius as in step (v), draw an arc cutting the arc drawn in step (v) at D.

(vii) Join points O and D, and extend the resulting ray to point Q.

Hence, $\angle POQ = 90°$ is the required angle.



(c) 150°

(i) Draw a ray XY.

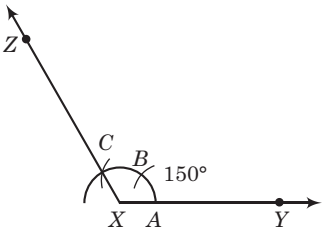
(ii) With X as centre and a convenient radius draw an arc cutting $\overrightarrow{XY}$ at A.

(iii) With A as centre and the same radius as in step 2, cut the first arc at B.

(iv) Again with B as centre and the same radius, cut the first arc at C.

(v) Join points X and C, and extend the resulting ray to point Z.

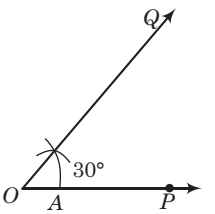
Hence, $\angle YXZ = 150°$ is the required angle.



(d) 30°

(i) Draw a ray OP.

(ii) With O as centre and a convenient radius, draw an arc intersecting $\overrightarrow{OP}$ at A.



(iii) With A as centre and same radius, draw another arc intersecting the previous arc at B.

(iv) Join OB and extend it to Q and $\angle POQ$ is the required angle of 30°.

2. Construct the following angles by using the inner scale of protractor.

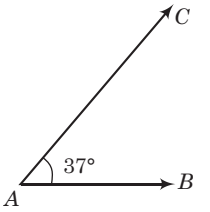
(a) 37°

(i) Draw a ray AB.

(ii) Place the centre of the protractor at A such that its straight edge or zero edge conincides with rayAB.

(iii) To make an angle of 37° at A, use the inner scale to right of point A. So, mark point C at the 37° mark of the protractor.

(iv) Join AC and $\angle BAC = 35°$ is the required angle.



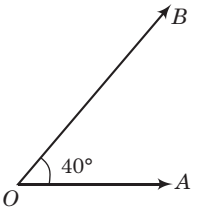
(b) 40°

(i) Draw a ray OA.

(ii) Place the centre of the protractor at O such that its straight edge or zero edge coincides with ray OA.

(iii) To make an angle of 40° at O, use the inner scale to right of point O. So, mark point B at the 40° mark of the protractor.

(iv) Join BO and $\angle AOB = 40°$ is the required angle.



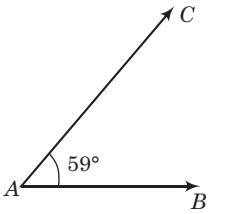
(c) 59°

(i) Draw a ray AB.

(ii) Place the centre of the protractor at A such that its straight edge or zero edge coincides with ray AB.

(iii) To make an angle of 59° at A, use the inner scale to right of point A. So, mark point C at the 59° mark of the protractor.

(iv) Join AC and $\angle BAC = 59°$ is the required angle.



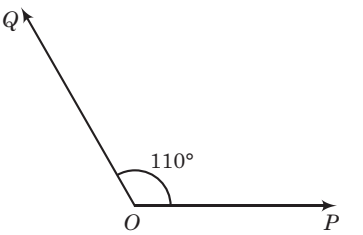
(d) 110°

(i) Draw a ray OP.

(ii) Place the centre of the protractor at O such that its straight edge or zero edge coincides with the ray OP.

(iii) To make an angle 110° at O, use the inner scale to right of point O. So, mark point Q at the 110° mark of the protractor.

(iv) Join OQ and $\angle POQ = 110°$ is the required angle.



3. Construct $\angle AOB = 130°$ using protractor. Draw a ray OX bisecting $\angle AOB$.

(i) Draw a ray OB.

(ii) Place the centre of the protractor at O such that its straight edge or zero edge coincide with the ray OB.

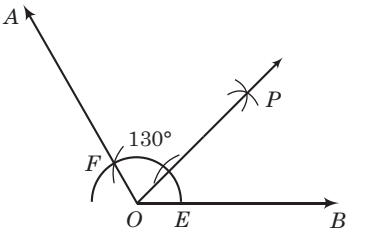
(iii) To make an angle of 130° at O, use the inner scale to right of point O. So, mark point at the 130° mark of the protractor.

(iv) Join OA and $\angle AOB$ is the required angle.

(v) With O as centre and a convenient radius draw an arc intersecting $\overrightarrow{OB}$ and $\overrightarrow{OC}$ at E and F respectvely.

(vi) With E as centre and radius more than half of EF, draw an arc.

(vii) With F as centre and with the same radius draw antother arc intersecting the previous arc at X.



(viii) Join OX, $\overrightarrow{OX}$ is the bisector of $\angle AOB$.

4. Construct an angle of measure $22\frac{1}{2}°$ using compass and ruler.

(i) Draw a ray OP.

(ii) With O as centre and a convenient radius, draw an arc intersecting $\overrightarrow{OP}$ at A.

(iii) With A as centre and same radius draw another arc intersecting the previous arc at B.

(iv) Joint OB and extend it to Q and $\angle POQ = 22\frac{1^\circ}{2}$ is the required angle.

5. Using protractor, draw an acute angle and an obtuse angle. Using ruler and compass, construct angles equal to them.

Do yourself.

6. Draw $\angle ABC$ of measure 70° and find its line of symmetry.

(i) Draw a ray OP.

(ii) With O as centre and a convenient radius, draw an arc intersecting $\overrightarrow{OP}$ at A.

(iii) With A as centre and same radius draw another arc intersecting the previous arc at B.

(iv) Join OB and extend it to Q and $\angle POQ$ is the required angle of 70°.

7. Draw a line segment $RS = 5$ cm. Take a point P on it at a distance of 3 cm from S. At P construct $\angle QPS = 60°$. Measure $\angle QPR$.

(i) Draw a line l and mark a point R on it.

(ii) With R as centre and radius 5 cm *i.e.* draw an arc cutting l at S.

(iii) Take a point P on it a distance of 3 cm from S.

(iv) With A as centre and same radius, draw another arc intersecting the previous arc at B.

(vi) Join PQ and extend it to Q and $\angle QPS$ is the required angle of 60°.

(v) $\angle QPS + \angle QPR = 180°$

$60° + \angle QPR = 180°$

$\angle QPR = 180° - 60° = 120°$

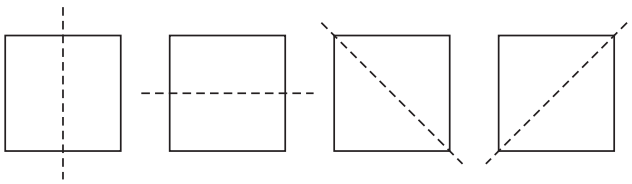
Chapter-14 : Symmetry

Exercise-1

1. **Give examples of 3 symmetrical objects.**

Circle, Rhombus and square three symmetrical objects.

2.



A square has 4 line of symmetry

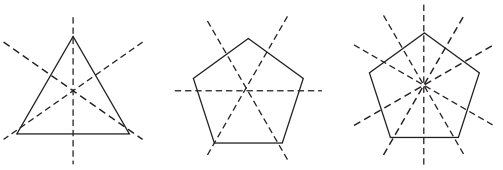
3. (a) Symmetric (b) Symmetric (c) Symmetric

(d) Symmetric (e) Not symmetric (f) Symmetric

4. (a) P and Q (b) A and I

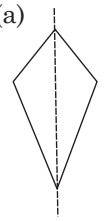
5. Infinite

6.

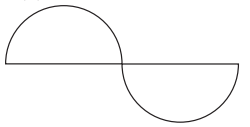


7. (1)

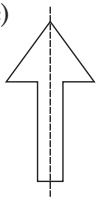
(a)



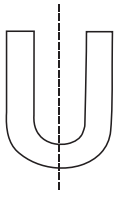
(b)



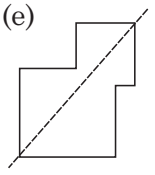
(c)



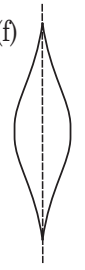
(d)



(e)

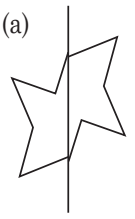


(f)

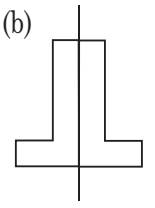


8.

(a)

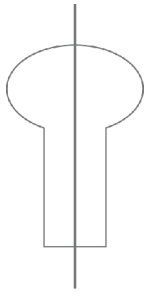


(b)



(c)

(d)



(e)