Miscellaneous Problems : Set 1

EXERCISE [PAGES 61 - 62]

Exercise | Q 2.1 | Page 61

Find the prime factor of the following number and find their LCM and HCF.

75, 135

Solution: 75, 135

3	75,135
5	25,45
5	5,9
9	1,9
	1,1

HCF = 3 × 5 = 15

LCM = 3 × 5 × 5 × 9 = 675

Exercise | Q 2.2 | Page 61

Find the prime factor of the following number and find their LCM and HCF.

114, 76

Solution: 114, 76

2	114,76
19	57, 38
2	3, 2
3	3, 1
	1, 1

HCF = 2 × 19 = 38
LCM = 2 × 19 × 2 × 3 = 228

Exercise | Q 2.3 | Page 61

Find the prime factor of the following number and find their LCM and HCF.

153, 187

Solution: 153, 187

17	153,187
9	9, 11
11	1, 11
	1, 1

HCF = 17

LCM = 17 × 9 × 11 = 1683

Exercise | Q 2.4 | Page 61

Find the prime factor of the following number and find their LCM and HCF.

32, 24, 48

Solution: 32, 24, 48

2	32,24,48
2	16,12,24
2	8,6,12
2	4,3,6
2	2,3,3
3	1,3,3
	1,1,1

HCF = 17

LCM = 17 × 9 × 11 = 1683

Exercise | Q 3.1 | Page 61

Simplify: $\frac{322}{391}$

Solution:

$$\frac{322}{391}$$
$$= \frac{322 \div 23}{391 \div 23}$$
$$= \frac{14}{17}$$

Exercise | Q 3.2 | Page 61

Simplify: $\frac{247}{209}$

Solution:

$$\frac{247}{209}$$
$$= \frac{247 \div 19}{209 \div 19}$$
$$= \frac{13}{11}$$

Exercise | Q 3.3 | Page 61

Simplify: $\frac{117}{156}$

Solution:

$$\frac{117}{156}$$
$$= \frac{117 \div 3}{156 \div 3}$$
$$= \frac{39 \div 3}{52 \div 3}$$
$$= \frac{13}{14}$$

Exercise | Q 4.1 | Page 61

Find the square root of the following number.

784

Solution:

	28
2 2	784 4
48 8	384 384
56	×

The square root of 784 is 28.

Exercise | Q 4.2 | Page 61

Find the square root of the following number.

225

Solution:

	15
1 1	225 1
25 5	125 125
30	×

The square root of 225 is 15.

Exercise | Q 4.3 | Page 61

Find the square root of the following number.

1296

Solution:

	36

3 3	1296 9
66 6	396 396
72	×

The square root of 1296 is 36.

Exercise | Q 4.4 | Page 61

Find the square root of the following number.

2025

Solution:

	45
4 4	2025 16
85 5	425 425
90	×

The square root of 2025 is 45.

Exercise | Q 4.5 | Page 61

Find the square root of the following number.

256

Solution:

16	
1 1	256 1
26 6	156 156

32	×

The square root of 256 is 15.

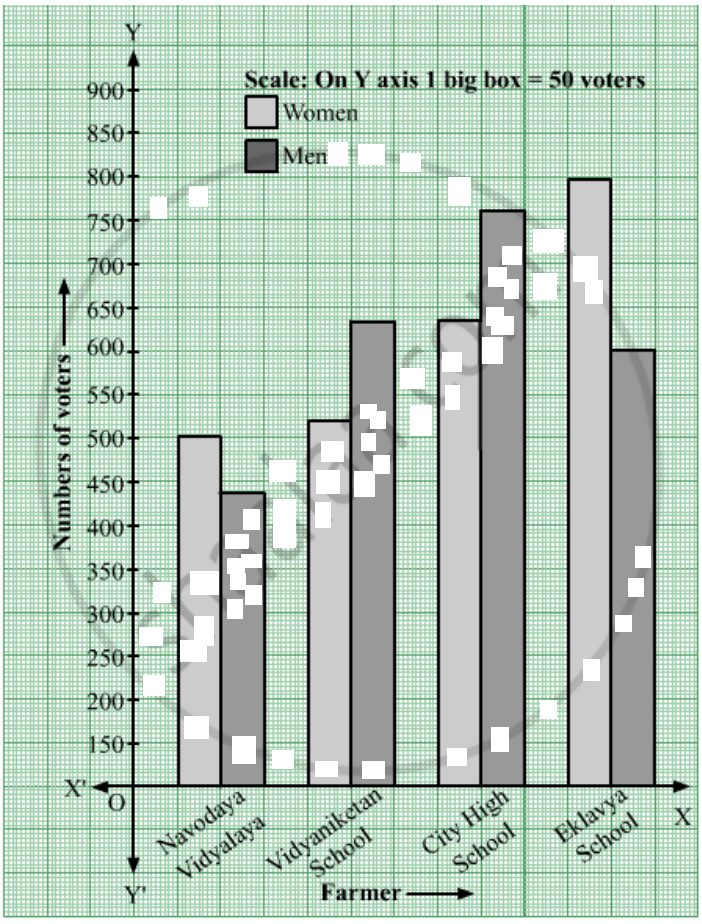
Exercise | Q 5 | Page 61

There are four polling booths for a certain election. The numbers of men and women who cast their vote at each booth is given in the table below. Draw a joint bar graph for this data.

Polling Booths	Navodaya Vidyalaya	Vidyaniketan School	City High School	Eklavya School
Women	500	520	680	800
Men	440	640	760	600

Solution:

The joint bar graph for the given data is:



Exercise | Q 6.1 | Page 61

Simplify the expression.

45 ÷ 5 + 20 × 4 − 12

Solution: 45 ÷ 5 + 20 × 4 − 12

= 9 + 80 − 12

= 89 − 12

= 77

Exercise | Q 6.2 | Page 61

Simplify the expression.

(38 − 8) × 2 ÷ 5 + 13

Solution: (38 − 8) × 2 ÷ 5 + 13

= 30 × 2 ÷ 5 + 13

= 60 ÷ 5 + 13

= 12 + 13

= 25

Exercise | Q 6.3 | Page 61

Simplify the expression.

$$\frac{5}{3} + \frac{4}{7} \div \frac{32}{21}$$

Solution:

$$\frac{5}{3} + \frac{4}{7} \div \frac{32}{21}$$

$$= \frac{5}{3} + \frac{4}{7} \times \frac{21}{32}$$

$$= \frac{5}{3} + \frac{3}{8}$$

$$= \frac{5 \times 8}{3 \times 8} + \frac{3 \times 3}{8 \times 3}$$

$$= \frac{40}{24} + \frac{9}{24}$$

$$= \frac{40 + 9}{24}$$

$$= \frac{49}{24}$$

Exercise | Q 6.4 | Page 61

Simplify the expression.

3 × {4 [85 + 5 − (15 ÷ 3)] + 2}

Solution: 3 × {4 [85 + 5 − (15 ÷ 3)] + 2}

= 3 × {4 [85] + 2}

= 3 × {340 + 2}

= 3 × 342

= 1026

Exercise | Q 7.1 | Page 61

Solve: $\frac{5}{12} + \frac{7}{16}$

Solution:

$$\frac{5}{12} + \frac{7}{16}$$

$$= \frac{5 \times 4}{12 \times 4} + \frac{7 \times 3}{16 \times 3}$$

$$= \frac{20}{48} + \frac{21}{48}$$

$$= \frac{20 + 21}{48}$$

= 41/48

Exercise | Q 7.2 | Page 61

Solve: $3\frac{2}{5} - 2\frac{1}{4}$

Solution:

$$3\frac{2}{5} - 2\frac{1}{4}$$

$$= \frac{17}{5} - \frac{9}{4}$$

$$= \frac{17 \times 4}{5 \times 4} - \frac{9 \times 5}{4 \times 5}$$

$$= \frac{68}{20} - \frac{45}{20}$$

$$= \frac{68 - 45}{20}$$

$$= \frac{23}{20}$$

Exercise | Q 7.3 | Page 61

Solve: $\frac{12}{5} \times \frac{-10}{3}$

Solution:

$$\frac{12}{5} \times \frac{-10}{3}$$

$$= \frac{12 \times (-10)(-2)}{5 \times 3}$$

$$= 4 \times (-2)$$

$$= -8$$

Exercise | Q 7.4 | Page 61

Solve: $4\frac{3}{8} \div \frac{25}{18}$

Solution:

$$4\frac{3}{8} \div \frac{25}{18}$$

$$= \frac{35}{8} \times \frac{18}{25}$$

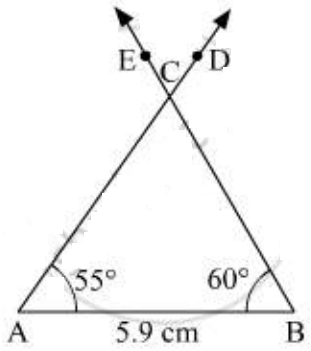
$$= \frac{7 \times 9}{4 \times 5}$$

$$= \frac{63}{20}$$

Exercise | Q 8 | Page 61

Construct ∆ABC such that m∠∠A = 55°, m∠∠B = 60°, and l(AB) = 5.9 cm.

Solution:



Steps of constructions:

(1) Draw seg AB of length 5.9 cm.

(2) Draw ray AD such that ∠BAD = 55°.

(3) Draw ray BE such that ∠ABE = 60°.

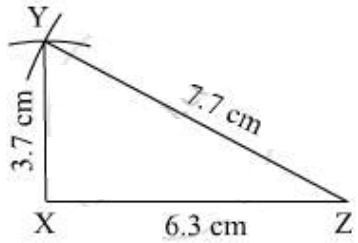
(4) Name the point of intersection of ray AD and BE as C.

Therefore, △ABC is the required triangle.

Exercise | Q 9 | Page 61

Construct ΔXYZ such that, l(XY) = 3.7 cm, l(YZ) = 7.7 cm, l(XZ) = 6.3 cm.

Solution:



Steps of constructions:

(1) Draw seg XZ of length 6.3 cm.

(2) Draw an arc of 3.7 cm from the vertex X.

(3) Draw another arc of 7.7 cm from the vertex Z, cutting the previously drawn arc at Y.

Therefore, △XYZ is the required triangle.

Exercise | Q 10 | Page 61

Construct ΔPQR such that, m∠P = 80°, m∠Q = 70°, l(QR) = 5.7 cm.

Solution:

In Δ PQR,

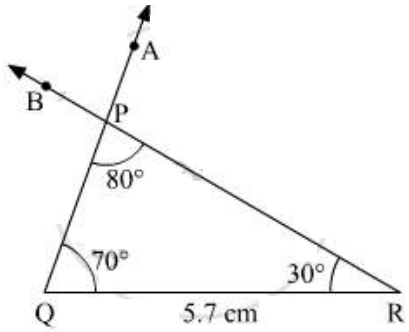
$\angle P + \angle Q + \angle R = 180^\circ$ (Angle sum property)

$\Rightarrow 80^\circ + 70^\circ + \angle R = 180^\circ$

$\Rightarrow 150^\circ + \angle R = 180^\circ$

$\Rightarrow \angle R = 180^\circ - 150^\circ$

$= 30^\circ$



Steps of constructions:

(1) Draw seg QR of length 5.7 cm.

(2) Draw ray QA such that $\angle RQA = 70°$.

(3) Draw ray RB such that $\angle QRB = 30°$.

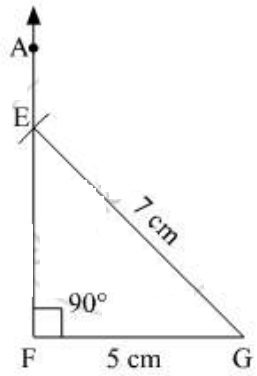
(4) Name the point of intersection of ray RB and QA as P.

Therefore, $\triangle PQR$ is the required triangle.

Exercise | Q 11 | Page 61

Construct ΔEFG from the given measures. l(FG) = 5 cm, m$\angle\angle EFG = 90°$, l(EG) = 7 cm.

Solution:



Steps of constructions:

(1) Draw seg FG of length 5 cm.

(2) Draw ray FA such that ∠GFA = 90°.

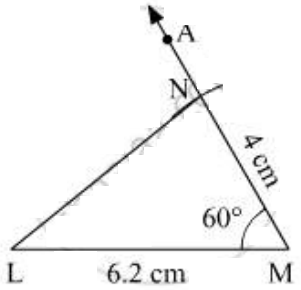
(3) Draw an arc of 7 cm from the vertex G, cutting the ray FA at E.

Therefore, △DEF is the required triangle.

Exercise | Q 12 | Page 61

In ∆LMN, l(LM) = 6.2 cm, m∠∠LMN = 60°, l(MN) = 4 cm. Construct ∆LMN.

Solution:



Steps of constructions:

(1) Draw seg LM of length 6.2 cm.

(2) Draw ray MA such that ∠LMA = 60°.

(3) Draw an arc of 4 cm from the vertex M, cutting the ray MA at N.

Therefore, △LMN is the required triangle.

Exercise | Q 13.1 | Page 61

Find the measures of the complementary angle of the following angle.

35˚

Solution: Let the measure of the complementary angle be a.

35 + a = 90

∴ a = 55°

Hence, the measure of the complement of an angle of measure 35° is 55°

Exercise | Q 13.2 | Page 61

Find the measures of the complementary angle of the following angle.

a°

Solution: Let the measure of the complementary angle be x.

a + x = 90

∴ x = (90 − a)°

Hence, the measure of the complement of an angle of measure a° is (90 − a)°

Exercise | Q 13.3 | Page 61

Find the measures of the complementary angle of the following angle.

22°

Solution: Let the measure of the complementary angle be a.

22 + a = 90

∴ a = 68°

Hence, the measure of the complement of an angle of measure 22° is 68°

Exercise | Q 13.4 | Page 61

Find the measures of the complementary angle of the following angle.

(40 - x)°

Solution: Let the measure of the complementary angle be a.

(40 − x) + a = 90

∴ a = (50 + x)°

Hence, the measure of the complement of an angle of measure (40 − x)° is (50 + x)°

Exercise | Q 14.1 | Page 61

Find the measures of the supplements of the following angle.

111°

Solution: Let the measure of the complementary angle be a.

111 + a = 180

∴ a = 69°

Hence, the measure of the complement of an angle of measure 111° is 69°

Exercise | Q 14.2 | Page 61

Find the measures of the supplements of the following angle.

47°

Solution: Let the measure of the complementary angle be x.

47 + x = 180

∴ x = 133°

Hence, the measure of the complement of an angle of measure 47° is 133°

Exercise | Q 14.3 | Page 61

Find the measures of the supplements of the following angle.

180°

Solution: Let the measure of the complementary angle be a.

180 + a = 180

∴ a = 0°

Hence, the measure of the complement of an angle of measure 180° is 0°

Exercise | Q 14.4 | Page 61

Find the measures of the supplements of the following angle.

$(90 - x)^{\circ}$

Solution: Let the measure of the complementary angle be a.

(90 − x) + a = 180

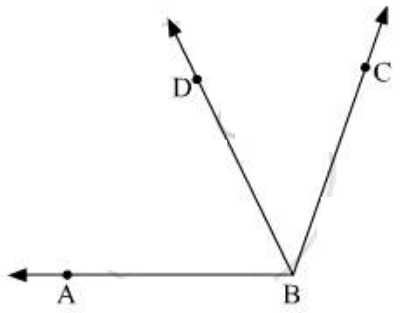
∴ a = (90 + x)°

Hence, the measure of the complement of an angle of measure (90 − x)° is (90 + x)°

Exercise | Q 15.1 | Page 61

Construct a pair of adjacent angles

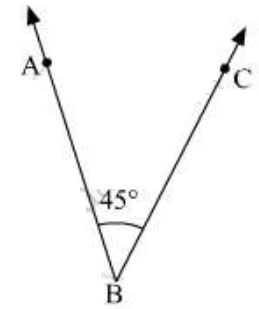
Solution:

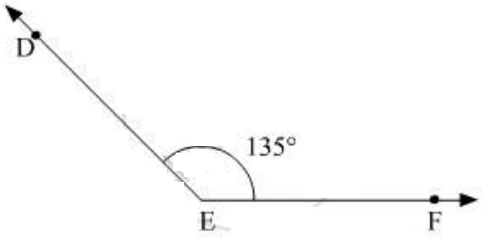


Exercise | Q 15.2 | Page 61

Construct the two supplementary angles which are not adjacent angles.

Solution:

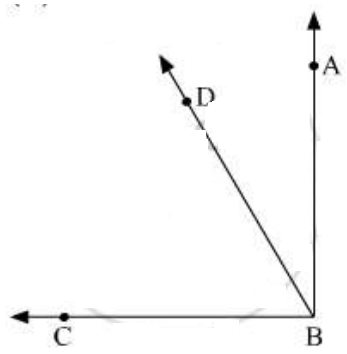




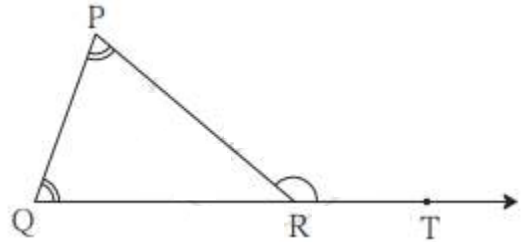
Exercise | Q 15.3 | Page 61

Construct a pair of adjacent complementary angles.

Solution:



Exercise | Q 16.1 | Page 62



In ∆PQR, the measures of ∠P and ∠Q are equal and m∠PRQ = 70°. Find the m∠PRT.

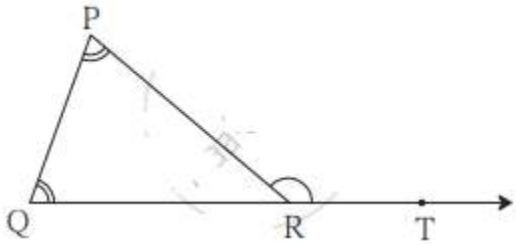
Solution: ∠PRQ + ∠PRT = 180° (Linear pair angles)

⇒ ∠PRT = 180° − 70°

= 110°

Hence, the measure of ∠PRT is 110°.

Exercise | Q 16.2 | Page 62



In ΔPQR, the measures of ∠P and ∠Q are equal and m∠PRQ = 70°. Find the m∠P.

Solution: In ΔPQR,

∠P + ∠Q = ∠PRT (Exterior angle property)

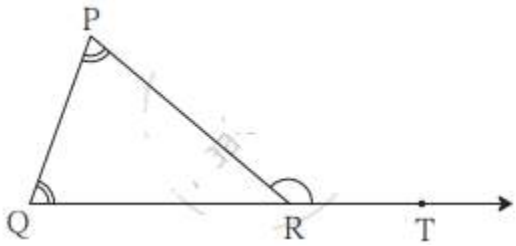
⇒ ∠P + ∠P = 110° (∠P = ∠Q)

⇒ 2∠P = 110°

⇒ ∠P = 55°

Hence, the measure of ∠P is 55°.

Exercise | Q 16.3 | Page 62



In ΔPQR, the measures of ∠P and ∠Q are equal and m∠PRQ = 70°. Find the m∠Q.

Solution: In ΔPQR,

∠P + ∠Q = ∠PRT (Exterior angle property)

⇒ ∠Q + ∠Q = 110° (∠P = ∠Q)

⇒ 2∠Q = 110°

⇒ ∠Q = 55°

Hence, the measure of ∠Q is 55°.

Exercise | Q 17.1 | Page 62

Simplify: $5^4 \times 5^3$

Solution: $5^4 \times 5^3$

$= 5^7$ ....[$\because a^m \times a^n = a^{m+n}$]

Exercise | Q 17.2 | Page 62

Simplify: $\left(\frac{2}{3}\right)^6 \div \left(\frac{2}{3}\right)^9$

Solution:

$$\left(\frac{2}{3}\right)^6 \div \left(\frac{2}{3}\right)^9$$

$$= \left(\frac{2}{3}\right)^{6-9} \quad ...[\because a^m \div a^n = a^{m-n}]$$

$$= \left(\frac{2}{3}\right)^{-3}$$

$$= \left(\frac{3}{2}\right)^3 \quad .... \left[\because a^{-m} = \frac{1}{a^m}\right]$$

Exercise | Q 17.3 | Page 62

Simplify: $\left(\frac{7}{2}\right)^8 \times \left(\frac{7}{2}\right)^{-6}$

Solution:

$$\left(\frac{7}{2}\right)^{8} \times \left(\frac{7}{2}\right)^{-6}$$

$$= \left(\frac{7}{2}\right)^{8+(-6)} \quad \text{.....}[\because a^m \times a^n = a^{m+n}]$$

$$= \left(\frac{7}{2}\right)^{2}$$

Exercise | Q 17.4 | Page 62

Simplify: $\left(\frac{4}{5}\right)^{2} \div \left(\frac{5}{4}\right)$

Solution:

$$\left(\frac{4}{5}\right)^{2} \div \left(\frac{5}{4}\right)$$

$$= \left(\frac{4}{5}\right)^{2} \times \left(\frac{4}{5}\right)$$

$$= \left(\frac{4}{5}\right)^{2+1} \quad \text{.....}[\because a^m \times a^n = a^{m+n}]$$

$$= \left(\frac{4}{5}\right)^{3}$$

Exercise | Q 18.1 | Page 62

Find the value of $17^{16} \div 17^{16}$

Solution: $17^{16} \div 17^{16}$

$= 17^{16-16}$ ....$[\because a^m \div a^n = a^{m-n}]$

$= 17^{0}$

$= 1$

Exercise | Q 18.2 | Page 62

Find the value of 10^{-3}

Solution:

$$10^{-3}$$

$$= \frac{1}{10^3} \quad \ldots \left[a^{-m} = \frac{1}{a^m}\right]$$

$$= \frac{1}{1000}$$

Exercise | Q 18.3 | Page 62

Find the value of $(2^3)^2$

Solution:

$$10^{-3}$$

$$= \frac{1}{10^3} \quad \ldots \left[a^{-m} = \frac{1}{a^m}\right]$$

$$= \frac{1}{1000}$$

Exercise | Q 18.4 | Page 62

Find the value of $4^6 \times 4^{-4}$

Solution: $4^6 \times 4^{-4}$

$$= 4^{6+(-4)} \quad \ldots [a^m \times a^n = a^m \times n]$$

$$= 4^{6-4}$$

$$= 4^2$$

$$= 16$$

Exercise | Q 19.1 | Page 62

Solve: (6a - 5b - 8c) + (15b + 2a - 5c)

Solution: (6a - 5b - 8c) + (15b + 2a - 5c)

= 6a - 5b - 8c + 15b + 2a - 5c

= 8a + 10b − 13c

Exercise | Q 19.2 | Page 62

Solve: (3x + 2y)(7x - 8y)

Solution: (3x + 2y)(7x - 8y)

= 3x (7x - 8y) + 2y(7x - 8y)

= $21x^2 - 24xy + 14xy - 16y^2$

= $21x^2 - 10xy - 16y^2$

Exercise | Q 19.3 | Page 62

Solve: (7m - 5n) - (- 4n - 11m)

Solution: (7m - 5n) - (- 4n - 11m)

= 7m - 5n + 4n + 11m

= 18m - n

Exercise | Q 19.4 | Page 62

Solve: (11m - 12n + 3p) - (9m + 7n - 8p)

Solution: (11m - 12n + 3p) - (9m + 7n - 8p)

= 11m - 12n + 3p - 9m - 7n + 8p

= 2m - 19n + 11p

Exercise | Q 20.1 | Page 62

Solve the following equation.

4(x + 12) = 8

Solution: 4(x + 12) = 8

⇒ 4x + 48 = 8

⇒ 4x + 48 − 48 = 8 − 48

⇒ 4x = − 40

⇒ x = − 10

Exercise | Q 20.2 | Page 62

Solve the following equation.

3y + 4 = 5y - 6

Solution: 3y + 4 = 5y - 6

⇒ 3y + 4 − 5y = 5y − 6 − 5y

⇒ 4 − 2y = − 6

⇒ 4 − 2y − 4 = − 6 − 4

⇒ − 2y = − 10

⇒ y = 5

MULTIPLE CHOICE QUESTIONS [PAGE 62]

Multiple Choice Questions | Q 1 | Page 62

Choose the right answer from the option.

The three angle bisectors of a triangle are concurrent. Their point of concurrence is called the _____.

1. circumcentre
2. apex
3. **incentre**
4. point of intersection

Solution: The three angle bisectors of a triangle are concurrent. Their point of concurrence is called the **incentre**.

Multiple Choice Questions | Q 2 | Page 62

Choose the right answer from the option.

$$\left[\left(\frac{3}{7}\right)^{-3}\right]^{4}$$

Options

$\left(\frac{3}{7}\right)^{-7}$

$\left(\frac{3}{7}\right)^{-10}$

$\left(\frac{7}{3}\right)^{12}$

$\left(\frac{3}{7}\right)^{20}$

Solution:

$$\left[\left(\frac{3}{7}\right)^{-3}\right]^{4} = \left(\frac{3}{7}\right)^{-3(4)} \quad \ldots[\because (a^m)^n = a^{mn}]$$

$$= \left(\frac{3}{7}\right)^{-12}$$

$$= \left(\frac{7}{3}\right)^{12} \quad \ldots\left[\because (a)^{-n} = \frac{1}{a^n}\right]$$

Multiple Choice Questions | Q 3 | Page 62

Choose the right answer from the option.

The simplest form of $5 \div \left(\frac{3}{2}\right) - \frac{1}{3}$ is _____.

1. **3**
2. 5
3. 0
4. 1/3

Solution:

$$5 \div \left(\frac{3}{2}\right) - \frac{1}{3} = 5 \times \frac{2}{3} - \frac{1}{3}$$

$$= \frac{10}{3} - \frac{1}{3}$$

$$= \frac{10 - 1}{3}$$

$$= \frac{9}{3}$$

$$= 3$$

Multiple Choice Questions | Q 4 | Page 62

Choose the right answer from the option.

The solution of the equation $3x - \frac{1}{2} = \frac{5}{2} + x$ is ____.

1. 5/3
2. 7/2
3. 4
4. **3/2**

Solution:

$$3x - \frac{1}{2} = \frac{5}{2} + x$$

$$\Rightarrow 3x - x - \frac{1}{2} = \frac{5}{2} + x - x$$

$$\Rightarrow 2x - \frac{1}{2} + \frac{1}{2} = \frac{5}{2} + \frac{1}{2}$$

$$\Rightarrow 2x = \frac{5}{2} + \frac{1}{2}$$

$$\Rightarrow 2x = 3$$

$$\Rightarrow x = \frac{3}{2}$$

Multiple Choice Questions | Q 5 | Page 62

Choose the right answer from the option.

Which of the following expressions has the value 37?

1. **10 × 3 + (5 + 2)**
2. 10 × 4 + (5 - 3)
3. 8 × 4 + 3
4. (9 × 3) + 2

Solution: 10 × 3 + (5 + 2)

= 10 × 3 + 7

= 30 + 7

= 37