RS Aggarwal Solutions for Class 10 Maths Chapter 4 Exercise 4.1: RS Aggarwal Solutions for Class 10 Maths Chapter 4 Exercise 4.1 provide detailed answers to the problems included in this exercise.

Exercise 4.1 focuses on understanding the basic properties of triangles, including the classification of triangles based on sides (equilateral, isosceles, scalene) and angles (acute, obtuse, right). The solutions offer step-by-step explanations for each problem, helping students grasp the fundamental concepts and principles related to triangles.

By practicing with these solutions, students can strengthen their understanding of triangle properties and prepare effectively for exams.

RS Aggarwal Solutions for Class 10 Maths Chapter 4 Exercise 4.1 Overview

RS Aggarwal Solutions for Class 10 Maths Chapter 4 Exercise 4.1 are created by subject experts from Physics Wallah. These solutions give clear explanations and correct answers to every question in the exercise. Exercise 4.1 focuses on learning about different types of triangles based on their sides and angles.

The solutions help students understand each problem step-by-step, so they can learn how to solve similar problems on their own. These solutions are very useful for students who want to improve their understanding of triangle properties and do well in their math studies.

RS Aggarwal Solutions for Class 10 Maths Chapter 4 Triangles Exercise 4.1 PDF

The PDF link provided below contains RS Aggarwal Solutions for Class 10 Maths Chapter 4, Exercise 4.1 on Triangles.

Exercise 4.1 focuses on understanding the properties and classifications of triangles based on their sides and angles. This PDF is a valuable resource for students to download, study, and practice solving problems independently. It helps students strengthen their grasp of geometric concepts related to triangles and prepares them effectively for exams.

RS Aggarwal Solutions for Class 10 Maths Chapter 4 Triangles Exercise 4.1 PDF

RS Aggarwal Solutions for Class 10 Maths Chapter 4 Triangles Exercise 4.1

Below we have provided RS Aggarwal Solutions for Class 10 Maths Chapter 4 Triangles Exercise 4.1 for the ease of the students –

Question 1.

Solution:

Given: AD = 3.6 cm, AB = 10 cm and AE = 4.5 cm.

Applying Thale's Theorem,

$\frac{AD}{DB} = \frac{AE}{EC}$

$\Rightarrow EC = \frac{AE}{AD} \times DB$

$\Rightarrow EC = \frac{4.5}{3.6} \times DB$ [∵ DB = AB – AD ⇒ DB = 10 – 3.6 = 6.4]

$\Rightarrow EC = \frac{4.5}{3.6} \times 6.4$

⇒ EC = 8

Now, AC = AE + EC

⇒ AC = 4.5 + 8 = 12.5

Hence, EC = 8 cm and AC = 12.5 cm

Question 1 B.

Solution:

Given: AB = 13.3 cm, AC = 11.9 cm and EC = 5.1 cm.

Applying Thale's Theorem,

$$\frac{AD}{DB} = \frac{AE}{EC}$$

Since we need to find DB first, we add 1 on both sides

$$\frac{AD}{DB} + 1 = \frac{AE}{EC} + 1$$

$$\Rightarrow \frac{AD+DB}{DB} = \frac{AE+EC}{EC}$$

$$\Rightarrow \frac{AB}{DB} = \frac{AC}{EC}$$

$$\Rightarrow DB = \frac{AB \times EC}{AC}$$

$$\Rightarrow DB = \frac{13.3 \times 5.1}{11.9}$$

$\Rightarrow$ DB = 5.7

AD is given by,

AD = AB – DB

⇒ AD = 13.3 – 5.7

⇒ AD = 7.6 cm

Hence, AD is 7.6

Question 1 C .

Solution:

Given: AD/DB = 4/7 or AD = 4 cm, DB = 7 cm, and AC = 6.6

Applying Thale's Theorem,

$$\frac{AD}{DB} = \frac{AE}{EC}$$

We have AE at RHS but we need AC, as the value of AC is given.

So by adding 1 to both sides of the equation, we can get the desired result

$$\Rightarrow \frac{AD}{DB} + 1 = \frac{AE}{EC} + 1$$

$\Rightarrow \frac{AD+DB}{DB} = \frac{AE+EC}{EC}$

$\Rightarrow \frac{4+7}{7} = \frac{AC}{EC}$

$\Rightarrow \frac{11}{7} = \frac{6.6}{EC}$

$\Rightarrow EC = \frac{6.6\times7}{11}$

⇒ EC = 4.2

AE is given by,

AE = AC – EC

⇒ AE = 6.6 – 4.2

⇒ AE = 2.4

Hence, AE is 2.4 cm.

Question 1 D .

Solution:

Given: AD/AB = 8/15 or AD = 8 cm, AB = 15 cm, and EC = 3.5 cm

By applying Thale's Theorem,

$$\frac{AD}{AB} = \frac{AE}{AC}$$

$$\Rightarrow \frac{AD}{AB} = \frac{AE}{AE+EC}$$

$$\Rightarrow \frac{8}{15} = \frac{AE}{AE+3.5}$$

⇒ 8×(AE + 3.5) = 15×AE

⇒ 8×AE + 28 = 15×AE

⇒ 15×AE – 8×AE = 28

⇒ 7×AE = 28

⇒ AE = 28/7 = 4

Hence, AE is 4 cm.

Question 2 A .

AE = (x + 2) cm and EC = (x - 1) cm.

Solution:

Given: AD = x cm,

DB = (x – 2) cm,

AE = (x + 2) cm and,

EC = (x – 1) cm

By applying Thale’s Theorem,

$\frac{AD}{DB} = \frac{AE}{EC}$

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

$\Rightarrow x(x - 1) = (x + 2)(x - 2)$

$\Rightarrow x^2 - x = x^2 - 4$

$\Rightarrow x = 4$

Thus, x = 4 cm

Question 2 B.

Solution:

Given: AD = 4 cm, DB = (x – 4) cm, AE = 8 cm and EC = (3x – 19) cm

By Thale's theorem,

$\frac{AD}{DB} = \frac{AE}{EC}$

$\Rightarrow \frac{4}{x-4} = \frac{8}{3x-19}$

⇒ 4(3x – 19) = 8(x – 4)

⇒ 12x – 76 = 8x – 32

⇒ 12x – 8x = 76 – 32

⇒ 4x = 44

⇒ x = 44/4 = 11

Thus, x = 11 cm

Question 2 C

Solution:

Given: AD = (7x – 4) cm, AE = (5x – 2), DB = (3x + 4) cm and EC = 3x cm

By Thale's theorem,

$\frac{AD}{DB} = \frac{AE}{EC}$

$\Rightarrow \frac{7x-4}{3x+4} = \frac{5x-2}{3x}$

$\Rightarrow 3x(7x - 4) = (5x - 2)(3x + 4)$

$\Rightarrow 21x^2 - 12x = 15x^2 + 20x - 6x - 8$

$\Rightarrow 21x^2 - 12x = 15x^2 + 14x - 8$

$\Rightarrow 21x^2 - 15x^2 - 12x - 14x + 8 = 0$

$\Rightarrow 6x^2 - 26x + 8 = 0$

$\Rightarrow 2\times(3x^2 - 13x + 4) = 0$ [Simplifying the equation]

$\Rightarrow 3x^2 - 13x + 4 = 0$

$\Rightarrow 3x^2 - 12x - x + 4 = 0$

$\Rightarrow 3x(x - 4) - (x - 4) = 0$

$\Rightarrow (3x - 1)(x - 4) = 0$

$\Rightarrow (3x - 1) = 0$ or $(x - 4) = 0$

$\Rightarrow x = 1/3$ or $x = 4$

Now since we've got two values of x, that is, 1/3 and 4. We shall check for its feasibility.

Substitute x = 1/3 in AD = (7x – 4), we get

AD = 7×(1/3) – 4 = -1.67, which is not possible since side of a triangle cannot be negative.

Hence, x = 4 cm.

Question 3 A.

Solution:

Here, by applying converse of Thale's theorem we can conclude whether or not DE ∥ BC.

By Thale's theorem,

$$\frac{AD}{DB} = \frac{AE}{EC}$$

Solving for $\frac{AD}{DB}$,

$\frac{AD}{DB} = \frac{5.7}{9.5} = \frac{57}{95} = 0.6$ ...(i)

Solving for $\frac{AE}{EC}$,

$\frac{AE}{EC} = \frac{4.8}{8} = 0.6$ ...(ii)

As equation (i) is equal to equation (ii),

$$\frac{AD}{DB} = \frac{AE}{EC}$$

it satisfies Thale's theorem.

Hence, we can say DE ∥ BC.

Question 3 B

Solution:

Here, by applying converse of Thale's theorem we can conclude whether or not DE ∥ BC.

By Thale's theorem,

$$\frac{AD}{DB} = \frac{AE}{EC}$$

Solving for $\frac{AD}{DB}$,

We need to find AD from given AB = 11.7 cm and BD = 6.5 cm.

AD = AB – BD

⇒ AD = 11.7 – 6.5

⇒ AD = 5.2

$\frac{AD}{DB} = \frac{5.2}{6.5} = \frac{52}{65} = 0.8$ ...(i)

Solving for $\frac{AE}{EC}$,

We need to find EC from given AC = 11.2 cm and AE = 4.2 cm.

EC = AC – AE

⇒ EC = 11.2 – 4.2

⇒ EC = 7

$\frac{AE}{EC} = \frac{4.2}{7} = 0.6$ ...(ii)

As equation (i) is not equal to equation (ii),

$$\frac{AD}{DB} \neq \frac{AE}{EC}$$

it doesn't satisfies Thale's theorem.

Hence, we can say DE not parallel to BC.

Question 3 C .

Solution:

Here, by applying converse of Thale's theorem we can conclude whether or not DE ∥ BC.

By Thale's theorem,

$\frac{AD}{DB} = \frac{AE}{EC}$

Solving for $\frac{AD}{DB}$,

We need to find DB from given AB = 10.8 cm and AD = 6.3 cm.

DB = AB – AD

⇒ DB = 10.8 – 6.3

⇒ DB = 4.5

$\frac{AD}{DB} = \frac{6.3}{4.5} = \frac{63}{45} = 1.4$ ...(i)

Solving for $\frac{AE}{EC}$,

We need to find AE from given AC = 9.6 cm and EC = 4 cm.

AE = AC – EC

⇒ AE = 9.6 – 4

⇒ AE = 5.6

$\frac{AE}{EC} = \frac{5.6}{4} = 1.4$ ...(ii)

As equation (i) is equal to equation (ii),

$\frac{AD}{DB} = \frac{AE}{EC}$

it satisfies Thale's theorem.

Hence, we can say DE ∥ BC.

Question 3 D.

Solution:

Here, by applying converse of Thale's theorem we can conclude whether or not DE ∥ BC.

By Thale's theorem,

$\frac{AD}{DB} = \frac{AE}{EC}$

Solving for $\frac{AD}{DB}$,

We need to find DB from given AB = 12 cm and AD = 7.2 cm.

DB = AB – AD

⇒ DB = 12 – 7.2

⇒ DB = 4.8

$\frac{AD}{DB} = \frac{7.2}{4.8} = \frac{72}{48} = 1.5$ ...(i)

Solving for $\frac{AE}{EC}$,

We need to find EC from given AC = 10 cm and AE = 6.4 cm.

EC = AC – AE

⇒ EC = 10 – 6.4

⇒ EC = 3.6

$\frac{AE}{EC} = \frac{6.4}{3.6} = \frac{64}{36} = 1.78$ ...(ii)

As equation (i) is not equal to equation (ii),

$$\frac{AD}{DB} \neq \frac{AE}{EC}$$

it doesn't satisfies Thale's theorem.

Hence, we can say DE is not parallel to BC.

Question 4 A.

Solution:

Given: AB = 6.4 cm, AC = 8 cm and BD = 5.6 cm

Since AD bisects ∠A, we can apply angle-bisector theorem in ΔABC,

$\frac{BD}{DC} = \frac{AB}{AC}$

Substituting given values, we get

$\frac{5.6}{DC} = \frac{6.4}{8}$

$\Rightarrow DC = \frac{5.6 \times 8}{6.4}$

⇒ DC = 7

Thus, DC is 7 cm.

Question 4 B.

Solution:

Given: AB = 10 cm, AC = 14 cm and BC = 6 cm

Since AD bisects ∠A, we can apply angle-bisector theorem in ΔABC,

$$\frac{BD}{DC} = \frac{AB}{AC}$$

Substituting given values, we get

$$\frac{BD}{DC} = \frac{10}{14}$$

To find BD and DC,

Let BD = x cm, and it's given that BC = 6 cm, then DC = (6 – x) cm

Then

$$\frac{x}{6 - x} = \frac{10}{14}$$

⇒ 14x = 10(6 – x)

⇒ 14x = 60 – 10x

⇒ 14x + 10x = 60

⇒ 24x = 60

⇒ x = 60/24 = 2.5

⇒ BD = 2.5 cm

If BD = 2.5 cm and BC = 6 cm, then DC = (6 – x) = (6 – 2.5) = 3.5

Thus, BD is 2.5 cm and DC = 3.5 cm.

Question 4 C.

Solution:

Given: AB = 5.6 cm, BC = 6 cm and BD = 3.2 cm

Since AD bisects ∠A, we can apply angle-bisector theorem in

ΔABC,

$$\frac{BD}{DC} = \frac{AB}{AC}$$

Substituting given values, we get

$$\frac{3.2}{DC} = \frac{5.6}{AC}$$

Here, DC is given by

DC = BC – BD

⇒ DC = 6 – 3.2 = 2.8

$$\frac{3.2}{2.8} = \frac{5.6}{AC}$$

$$\Rightarrow AC = \frac{5.6 \times 2.8}{3.2}$$

⇒ AC = 4.9

Thus, AC is 4.9 cm.

Question 4 D.

Solution:

Given: AB = 5.6 cm, AC = 4 cm and DC = 3 cm

Since AD bisects ∠A, we can apply angle-bisector theorem in ΔABC,

$\frac{BD}{DC} = \frac{AB}{AC}$

Substituting given values, we get

$\frac{BD}{3} = \frac{5.6}{4}$

$\Rightarrow BD = \frac{5.6 \times 3}{4}$

⇒ BD = 4.2

Now, BC = BD + DC

⇒ BC = 4.2 + 3 = 7.2

Thus, BC is 7.2 cm.

Question 5 .

Solution:

(i). Given: ABCD is a parallelogram.

To Prove: $\frac{DM}{MN} = \frac{DC}{BN}$

Proof: In ΔDMC and ΔNMB,

∠DMC = ∠NMB [∵ they are vertically opposite angles]

∠DCM = ∠NBM [∵ they are alternate angles]

∠CDM = ∠MNB [∵ they are alternate angles]

By AAA-similarity, we can say

ΔDMC ~ ΔNMB

So, from similarity of the triangle, we can say

$$\frac{DM}{MN} = \frac{DC}{BN}$$

Hence, proved.

(ii). Given: ABCD is a parallelogram.

To Prove: $\frac{DN}{DM} = \frac{AN}{DC}$

Proof: As we have already derived

$$\frac{DM}{MN} = \frac{DC}{BN}$$

Add 1 on both sides of the equation, we get

$$\frac{DM}{MN} + 1 = \frac{DC}{BN} + 1$$

$\Rightarrow \frac{DM+MN}{MN} = \frac{DC+BN}{BN}$

$\Rightarrow \frac{DM+MN}{MN} = \frac{AB+BN}{BN}$ [∵ ABCD is a parallelogram and a parallelogram's opposite sides are always equal ⇒ DC = AB]

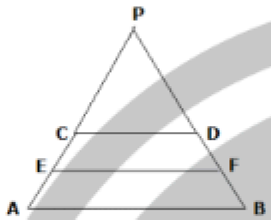
$\Rightarrow \frac{DN}{MN} = \frac{AN}{BN}$

Hence, proved.

Question 6 .

Solution:

We can draw the trapezium as



Here, let EF be the line segment joining the oblique sides of the trapezium at midpoints E and F (say) correspondingly.

Construction: Extend AD and BC such that it meets at P.

To Prove: EF ∥ DC and EF ∥ AB

Proof: Given that, ABCD is trapezium which means DC ∥ AB. … (i)

In ΔPAB,

DC ∥ AB ----by (i)

So, this means we can apply Thale's theorem in ΔPAB. We get

$\frac{PD}{DA} = \frac{PC}{CB}$ …(ii)

∵ E and F are midpoints of AD and BC respectively, we can write

DA = DE + EA

Or DA = 2DE …(iii)

CB = CF + FB

Or CB = 2CF …(iv)

Substituting equation (iii) and (iv) in equation (ii), we get

$\frac{PD}{2DE} = \frac{PC}{2CF}$

$\Rightarrow \frac{PD}{DE} = \frac{PC}{CF}$

By applying converse of Thale's theorem, we can write DC ∥ EF.

Now if DC ∥ EF, and we already know that DC ∥ AB.

⇒ EF is also parallel to AB, that is, EF ∥ AB.

This means, DC ∥ EF ∥ AB.

Hence, proved.

Question 7.

Solution:

In the trapezium ABCD, AB || DC.

Also, AC and BD intersect at O.

Thus,

$\frac{AO}{OC} = \frac{BO}{OD}$

$\Rightarrow \frac{5x-7}{2x+1} = \frac{7x-5}{7x+1}$

⇒ (5x – 7)(7x + 1) = (7x – 5)(2x + 1)

$\Rightarrow 35x^2 + 5x - 49x - 7 = 14x^2 - 10x + 7x - 5$

$\Rightarrow 35x^2 - 44x - 7 = 14x^2 - 3x - 5$

$\Rightarrow 35x^2 - 14x^2 - 44x + 3x - 7 + 5 = 0$

$\Rightarrow 21x^2 - 41x - 2 = 0$

$\Rightarrow 21x^2 - 42x + x - 2 = 0$

$\Rightarrow 21x(x - 2) + (x - 2) = 0$

$\Rightarrow (21x + 1)(x - 2) = 0$

$\Rightarrow (21x + 1) = 0$ or $(x - 2) = 0$

$\Rightarrow x = -1/21$ or $x = 2$

But $x = -1/21$ doesn't satisfy the length of intersected lines.

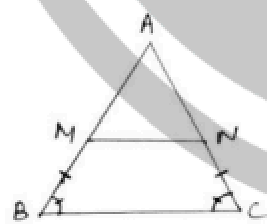
So $x \neq -1/21$

And thus, $x = 2$.

Question 8.

Solution:

We have



To show that, MN ∥ BC.

Given that, ∠B = ∠C and BM = CN.

So, AB = AC [sides opposite to equal angles (∠B = ∠C) are equal]

Subtract BM from both sides, we get

AB – BM = AC – BM

⇒ AB – BM = AC – CN

⇒ AM = AN

⇒ ∠AMN = ∠ANM

[angles opposite to equal sides (AM = AN) are equal] …(i)

We know in ΔABC,

∠A + ∠B + ∠C = 180° [∵ sum of angles of a triangle is 180°] …(ii)

And in ΔAMN,

∠A + ∠AMN + ∠ANM = 180° [∵ sum of angles of a triangle is 180°] …(iii)

Comparing equations (ii) and (iii), we get

∠A + ∠B + ∠C = ∠A + ∠AMN + ∠ANM

⇒ ∠B + ∠C = ∠AMN + ∠ANM

⇒ 2∠B = 2∠AMN [∵ from equation (i), and also ∠B = ∠C]

⇒ ∠B = ∠AMN

Thus, MN ∥ BC since the corresponding angles, ∠AMN = ∠B.

Question 9 .

Solution:

We can observe two triangles in the figure.

In ΔABC,

PQ ∥ AB

Applying Thale's theorem, we get

$\frac{CP}{PB} = \frac{CQ}{QA}$ ...(i)

In ΔBDC,

PR ∥ BP

Applying Thale's theorem, we get

$\frac{CP}{QA} = \frac{CR}{RO}$ ...(ii)

Comparing equations (i) and (ii),

$\frac{CQ}{QA} = \frac{CR}{RO}$

Now, applying converse of Thale's theorem, we get

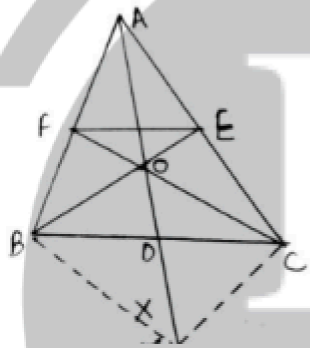
QR ∥ AD

Hence, QR is parallel to the AD.

Question 10.

Solution:

We have the diagram as,



Given: BD = DC & OD = DX

To Prove: $\frac{AO}{AX} = \frac{AF}{AB}$ and also, EF ∥ BC

Proof: Since, from the diagram we can see that diagonals OX and BC bisect each other in quadrilateral BOCX. Thus, BOCX is a parallelogram.

If BOCX is a parallelogram, BX ∥ OC, and BO ∥ CX.

⇒ BX ∥ FC (as OC extends to FC) and CX ∥ BE (BO extends to BE)

⇒ BX ∥ OF and CX ∥ OE

∵ BX ∥ OF, applying Thale's theorem in ΔABX, we get

$\frac{AO}{AX} = \frac{AF}{AB}$ ...(i)

Now since CX ∥ OE, applying Thale's theorem in ΔACX, we get

$\frac{AO}{AX} = \frac{AE}{AC}$ ...(ii)

By equations (i) and (ii), we get

$$\frac{AF}{AB} = \frac{AE}{AC}$$

By applying converse of Thale's theorem in the above equation, we can write

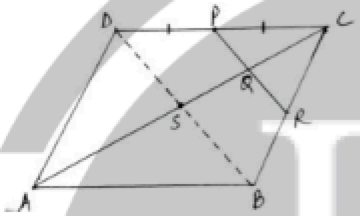
EF ∥ BC

Hence, proved.

Question 11.

Solution:

We have the diagram as



Given: DP = PC &

CQ = (1/4)AC ...(i)

To Prove: CR = RB

Proof: Join B to D

As diagonals of a parallelogram bisect each other at S.

$CS = \frac{1}{2}AC$ ...(ii)

Dividing equation (i) by (ii), we get

$\frac{CQ}{CS} = \frac{AC}{4} \times \frac{2}{AC}$

$\Rightarrow \frac{CQ}{CS} = \frac{1}{2}$

⇒ CQ = CS/2

⇒ Q is the midpoint of CS.

According to midpoint theorem in ΔCSD, we have

PQ ∥ DS

Similarly, in ΔCSB, we have

QR ∥ SB

Also, given that CQ = QS

We can conclude that, by the converse of midpoint theorem, CR = RB.

That is, R is the midpoint of CB.

Hence, proved.

Question 12 .

Solution:

Given: AD = AE ...(i)

& AB = AC ...(ii)

Subtracting AD from both sides of equation (ii), we get

AB – AD = AC – AD

⇒ AB – AD = AC – AE [from equation (i)]

⇒ DB = EC [∵ AB – AD = DB & AC – AE = EC] ...(iii)

Now, divide equation (i) by (iii), we get

$\frac{AD}{DB} = \frac{AE}{EC}$

By converse of Thale's theorem, we can conclude by this equation that DE ∥ BC.

So, ∠DEC + ∠ECB = 180° [∵ sum of interior angles on the same transversal line is 180°]

Or ∠DEC + ∠DBC = 180° [∵ AB = AC ⇒ ∠C = ∠B]

Hence, we can write DEBC is cyclic and points D, E, B and C are concyclic.

Question 13 .

Solution:

Given: ∠PBR = ∠QBR & PQ ∥ AC.

In ΔBQP,

BR bisects ∠B such that ∠PBR = ∠QBR.

Since angle-bisector theorem says that, if two angles are bisected in a triangle then it equates their relative lengths to the relative lengths of the other two sides of the triangles.

So by applying angle-bisector theorem, we get

$$\frac{QR}{PR} = \frac{BQ}{BP}$$

⇒ QR × BP = PR × BQ

Hence, proved.

Benefits of RS Aggarwal Solutions for Class 10 Maths Chapter 4 Exercise 4.1

- **Clear Explanations**: The solutions provide clear, step-by-step explanations for each problem, helping students understand the concepts and methods used to solve them.
- **Comprehensive Coverage**: Exercise 4.1 covers fundamental concepts of triangles, including their types based on sides (equilateral, isosceles, scalene) and angles (acute,

obtuse, right). The solutions ensure that all aspects of these concepts are thoroughly explained.

- **Practice Problems**: The exercise includes a variety of practice problems that allow students to apply their knowledge and skills. The solutions guide them through the process of solving these problems effectively.
- **Exam Preparation**: By practicing with these solutions, students can familiarize themselves with the types of questions that may appear in exams. This helps them build confidence and improve their performance.
- **Enhanced Understanding**: Through detailed solutions, students gain a deeper understanding of triangle properties and geometric principles. This strengthens their foundational knowledge in mathematics.
- **Accuracy and Reliability**: Prepared by subject experts from Physics Wallah, the solutions ensure accuracy and reliability, providing correct answers and explanations to help students learn effectively.
- **Improvement in Problem-Solving Skills**: Regular practice with these solutions enhances students' problem-solving skills, preparing them to tackle more complex mathematical problems confidently.