RD Sharma Solutions Class 10 Maths Chapter 4 Exercise 4.2: In Chapter 4 of RD Sharma Class 10 Maths, the focus is on triangles explain various properties and theorems related to them. Exercise 4.2 specifically emphasizes the application of the triangle inequality theorem, which states that the sum of the lengths of any two sides of a triangle must be greater than the length of the third side.

This exercise includes problems that require students to determine whether a set of three given lengths can form a triangle, reinforcing their understanding of this crucial theorem. By working through these problems students enhance their skills in geometric reasoning and develop a deeper appreciation for the fundamental properties of triangles, preparing them for more complex geometric concepts in future studies.

RD Sharma Solutions Class 10 Maths Chapter 4 Exercise 4.2 Overview

In Chapter 4 of RD Sharma Class 10 Maths, the topic is about triangles and Exercise 4.2 focuses on the triangle inequality theorem. This exercise asks students to check if three given lengths can form a triangle using the rules of the triangle inequality.

The solutions for Exercise 4.2 are created by subject experts at Physics Wallah making sure students understand the topic well. Each solution not only provides an answer but also helps explain the basic concepts of triangles. By using these easy-to-follow solutions, students can improve their skills in geometry which is important for doing well in math class.

RD Sharma Solutions Class 10 Maths Chapter 4 Exercise 4.2 PDF

RD Sharma Solutions for Class 10 Maths Chapter 4, Exercise 4.2 provide a detailed overview of the triangle inequality theorem.

Each solution is created by subject experts at Physics Wallah, ensuring clarity and simple explanations. Students can easily grasp the concepts and improve their problem-solving skills in geometry. For convenience, the PDF link to the solutions is available below allowing easy access for further study and practice.

RD Sharma Solutions Class 10 Maths Chapter 4 Exercise 4.2 PDF

RD Sharma Solutions Class 10 Maths Chapter 4 Exercise 4.2

Here is the RD Sharma Solutions Class 10 Maths Chapter 4 Exercise 4.2 Triangles-

1. In a Δ ABC, D and E are points on the sides AB and AC, respectively, such that DE || BC.

i) If AD = 6 cm, DB = 9 cm and AE = 8 cm, Find AC.

Solution:

Given: Δ ABC, DE // BC, AD = 6 cm, DB = 9 cm and AE = 8 cm.

Required to find AC.

By using Thales Theorem, [As DE // BC]

AD/BD = AE/CE

Let CE = x.

So then,

6/9 = 8/x

6x = 72 cm

x = 72/6 cm

x = 12 cm

∴ AC = AE + CE = 12 + 8 = 20.

ii) If AD/DB = 3/4 and AC = 15 cm, Find AE.

Solution:

Given: AD/BD = 3/4 and AC = 15 cm [As DE // BC]

Required to find AE.

By using Thales Theorem, [As DE // BC]

AD/BD = AE/CE

Let, AE = x, then CE = 15-x.

⇒ 3/4 = x/ (15–x)

45 – 3x = 4x

-3x – 4x = – 45

7x = 45

x = 45/7

x = 6.43 cm

∴ AE= 6.43cm

iii) If AD/DB = 2/3 and AC = 18 cm, Find AE.

Solution:

Given: AD/BD = 2/3 and AC = 18 cm

Required to find AE.

By using Thales Theorem, [As DE // BC]

AD/BD = AE/CE

Let, AE = x and CE = 18 – x

⇒ 23 = x/ (18–x)

3x = 36 – 2x

5x = 36 cm

x = 36/5 cm

x = 7.2 cm

∴ AE = 7.2 cm

iv) If AD = 4 cm, AE = 8 cm, DB = x – 4 cm and EC = 3x – 19, find x.

Solution:

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

Required to find x.

By using Thales Theorem, [As DE // BC]

AD/BD = AE/CE

Then, 4/ (x – 4) = 8/ (3x – 19)

4(3x – 19) = 8(x – 4)

12x – 76 = 8(x – 4)

12x – 8x = – 32 + 76

4x = 44 cm

x = 11 cm

v) If AD = 8 cm, AB = 12 cm and AE = 12 cm, find CE.

Solution:

Given: AD = 8 cm, AB = 12 cm, and AE = 12 cm.

Required to find CE,

By using Thales Theorem, [As DE // BC]

AD/BD = AE/CE

8/4 = 12/CE

8 x CE = 4 x 12 cm

CE = (4 x 12)/8 cm

CE = 48/8 cm

∴ CE = 6 cm

vi) If AD = 4 cm, DB = 4.5 cm and AE = 8 cm, find AC.

Solution:

Given: AD = 4 cm, DB = 4.5 cm, AE = 8 cm

Required to find AC.

By using Thales Theorem, [As DE // BC]

AD/BD = AE/CE

4/4.5 = 8/AC

AC = (4.5 × 8)/4 cm

∴AC = 9 cm

vii) If AD = 2 cm, AB = 6 cm and AC = 9 cm, find AE.

Solution:

Given: AD = 2 cm, AB = 6 cm and AC = 9 cm

Required to find AE.

DB = AB – AD = 6 – 2 = 4 cm

By using Thales Theorem, [As DE // BC]

AD/BD = AE/CE

2/4 = x/ (9–x)

4x = 18 – 2x

6x = 18

x = 3 cm

∴ AE= 3cm

viii) If AD/BD = 4/5 and EC = 2.5 cm, Find AE.

Solution:

Given: AD/BD = 4/5 and EC = 2.5 cm

Required to find AE.

By using Thales Theorem, [As DE // BC]

AD/BD = AE/CE

Then, 4/5 = AE/2.5

∴ AE = 4 × 2.55 = 2 cm

ix) If AD = x cm, DB = x – 2 cm, AE = x + 2 cm, and EC = x – 1 cm, find the value of x.

Solution:

Given: AD = x, DB = x – 2, AE = x + 2 and EC = x – 1

Required to find the value of x.

By using Thales Theorem, [As DE // BC]

AD/BD = AE/CE

So, x/ (x–2) = (x+2)/ (x–1)

x(x – 1) = (x – 2)(x + 2)

$x^2 – x – x^2 + 4 = 0$

x = 4

x) If AD = 8x – 7 cm, DB = 5x – 3 cm, AE = 4x – 3 cm, and EC = (3x – 1) cm, Find the value of x.

Solution:

Given: AD = 8x – 7, DB = 5x – 3, AER = 4x – 3 and EC = 3x -1

Required to find x.

By using Thales Theorem, [As DE // BC]

AD/BD = AE/CE

(8x–7)/ (5x–3) = (4x–3)/ (3x–1)

(8x – 7)(3x – 1) = (5x – 3)(4x – 3)

$24x^2 – 29x + 7 = 20x^2 – 27x + 9$

$4x^2 – 2x – 2 = 0$

$2(2x^2 – x – 1) = 0$

$2x^2 – x – 1 = 0$

$2x^2 – 2x + x – 1 = 0$

2x(x – 1) + 1(x – 1) = 0

(x – 1)(2x + 1) = 0

⇒ x = 1 or x = -1/2

We know that the side of a triangle can never be negative. Therefore, we take the positive value.

∴ x = 1.

xi) If AD = 4x – 3, AE = 8x – 7, BD = 3x – 1, and CE = 5x – 3, find the value of x.

Solution:

Given: AD = 4x – 3, BD = 3x – 1, AE = 8x – 7 and EC = 5x – 3

Required to find x.

By using Thales Theorem, [As DE // BC]

AD/BD = AE/CE

So, (4x–3)/ (3x–1) = (8x–7)/ (5x–3)

(4x – 3)(5x – 3) = (3x – 1)(8x – 7)

4x(5x – 3) -3(5x – 3) = 3x(8x – 7) -1(8x – 7)

$20x^2 – 12x – 15x + 9 = 24x^2 – 29x + 7$

$20x^2 -27x + 9 = 24^2 -29x + 7$

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

$4x^2 – 2x – 2 = 0$

$4x^2 – 4x + 2x – 2 = 0$

4x(x – 1) + 2(x – 1) = 0

(4x + 2)(x – 1) = 0

⇒ x = 1 or x = -2/4

We know that the side of a triangle can never be negative. Therefore, we take the positive value.

∴ x = 1

xii) If AD = 2.5 cm, BD = 3.0 cm, and AE = 3.75 cm, find the length of AC.

Solution:

Given: AD = 2.5 cm, AE = 3.75 cm and BD = 3 cm

Required to find AC.

By using Thales Theorem, [As DE ∥ BC]

AD/BD = AE/CE

2.5/ 3 = 3.75/ CE

2.5 x CE = 3.75 x 3

CE = 3.75×32.5

CE = 11.252.5

CE = 4.5

Now, AC = 3.75 + 4.5

∴ AC = 8.25 cm.

2. In a ∆ ABC, D and E are points on the sides AB and AC, respectively. For each of the following cases show that DE ∥ BC:

i) AB = 12 cm, AD = 8 cm, AE = 12 cm, and AC = 18 cm.

Solution:

Required to prove DE ∥ BC.

We have,

AB = 12 cm, AD = 8 cm, AE = 12 cm, and AC = 18 cm**.** (Given)

So,

BD = AB – AD = 12 – 8 = 4 cm

And,

CE = AC – AE = 18 – 12 = 6 cm

It's seen that,

AD/BD = 8/4 = 1/2

AE/CE = 12/6 = 1/2

Thus,

AD/BD = AE/CE

So, by the converse of Thale's Theorem

We have,

DE // BC.

Hence Proved.

ii) AB = 5.6 cm, AD = 1.4 cm, AC = 7.2 cm, and AE = 1.8 cm.

Solution:

Required to prove DE // BC.

We have,

AB = 5.6 cm, AD = 1.4 cm, AC = 7.2 cm, and AE = 1.8 cm**.** (Given)

So,

BD = AB – AD = 5.6 – 1.4 = 4.2 cm

And,

CE = AC – AE = 7.2 – 1.8 = 5.4 cm

It's seen that,

AD/BD = 1.4/4.2 = 1/3

AE/CE = 1.8/5.4 =1/3

Thus,

AD/BD = AE/CE

So, by the converse of Thale's Theorem

We have,

DE // BC.

Hence Proved.

iii) AB = 10.8 cm, BD = 4.5 cm, AC = 4.8 cm, and AE = 2.8 cm.

Solution:

Required to prove DE // BC.

We have

AB = 10.8 cm, BD = 4.5 cm, AC = 4.8 cm, and AE = 2.8 cm.

So,

AD = AB – DB = 10.8 – 4.5 = 6.3

And,

CE = AC – AE = 4.8 – 2.8 = 2

It's seen that,

AD/BD = 6.3/ 4.5 = 2.8/ 2.0 = AE/CE = 7/5

So, by the converse of Thale's Theorem

We have,

DE // BC.

Hence Proved.

iv) AD = 5.7 cm, BD = 9.5 cm, AE = 3.3 cm, and EC = 5.5 cm.

Solution:

Required to prove DE // BC.

We have

AD = 5.7 cm, BD = 9.5 cm, AE = 3.3 cm, and EC = 5.5 cm

Now,

AD/BD = 5.7/9.5 =3/5

And,

AE/CE = 3.3/5.5 = 3/5

Thus,

AD/BD = AE/CE

So, by the converse of Thale's Theorem

We have,

DE // BC.

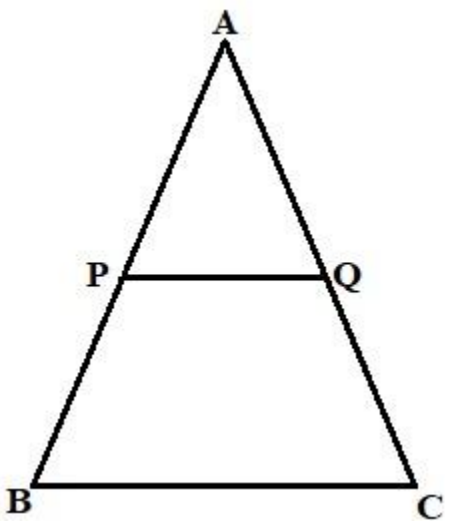
Hence Proved.

3. In a Δ ABC, P and Q are the points on sides AB and AC, respectively, such that PQ // BC. If AP = 2.4 cm, AQ = 2 cm, QC = 3 cm and BC = 6 cm. Find AB and PQ.

Solution:

Given: Δ ABC, AP = 2.4 cm, AQ = 2 cm, QC = 3 cm, and BC = 6 cm. Also, PQ // BC.

Required to find: AB and PQ.



By using Thales Theorem, we have [As it's given that PQ // BC]

AP/PB = AQ/ QC

2.4/PB = 2/3

2 x PB = 2.4 x 3

PB = (2.4 × 3)/2 cm

⇒ PB = 3.6 cm

Now finding, AB = AP + PB

AB = 2.4 + 3.6

⇒ AB = 6 cm

Now, considering Δ APQ and Δ ABC

We have,

∠A = ∠A

∠APQ = ∠ABC (Corresponding angles are equal, PQ||BC and AB being a transversal)

Thus, Δ APQ and Δ ABC are similar to each other by AA criteria.

Now, we know that

Corresponding parts of similar triangles are propositional.

⇒ AP/AB = PQ/ BC

⇒ PQ = (AP/AB) x BC

= (2.4/6) x 6 = 2.4

∴ PQ = 2.4 cm.

4. In a Δ ABC, D and E are points on AB and AC, respectively, such that DE // BC. If AD = 2.4 cm, AE = 3.2 cm, DE = 2 cm and BC = 5 cm. Find BD and CE.

Solution:

Given: Δ ABC such that AD = 2.4 cm, AE = 3.2 cm, DE = 2 cm and BE = 5 cm. Also DE // BC.

Required to find: BD and CE.

As DE // BC, AB is transversal,

∠APQ = ∠ABC (corresponding angles)

As DE // BC, AC is transversal,

∠AED = ∠ACB (corresponding angles)

In Δ ADE and Δ ABC,

∠ADE=∠ABC

∠AED=∠ACB

∴ Δ ADE = Δ ABC (AA similarity criteria)

Now, we know that

Corresponding parts of similar triangles are propositional.

⇒ AD/AB = AE/AC = DE/BC

AD/AB = DE/BC

2.4/ (2.4 + DB) = 2/5 [Since, AB = AD + DB]

2.4 + DB = 6

DB = 6 – 2.4

DB = 3.6 cm

In the same way,

⇒ AE/AC = DE/BC

3.2/ (3.2 + EC) = 2/5 [Since AC = AE + EC]

3.2 + EC = 8

EC = 8 – 3.2

EC = 4.8 cm

∴ BD = 3.6 cm and CE = 4.8 cm.

Benefits of Solving RD Sharma Solutions Class 10 Maths Chapter 4 Exercise 4.2

Solving RD Sharma Solutions for Class 10 Maths Chapter 4 Exercise 4.2 provide several benefits for students:

Conceptual Understanding: This exercise focuses on the triangle inequality theorem, which is fundamental in geometry. By working through the problems, students gain a deeper understanding of how to apply this theorem in various scenarios.

Improved Problem-Solving Skills: The solutions are created to enhance critical thinking and analytical skills. Students learn how to approach and solve geometric problems systematically which is valuable not only in exams but also in real-life applications.

Step-by-Step Guidance: Each solution provides detailed steps making it easier for students to follow the reasoning behind each answer. This helps them to identify any mistakes in their own calculations and understand the correct methods.

Practice for Exams: Regular practice using these solutions prepares students for their upcoming exams by familiarizing them with the types of questions they may encounter. This can boost their confidence and reduce exam anxiety.

Accessibility and Convenience: The solutions are readily available in PDF format, allowing students to study at their own pace and revisit concepts as needed. This flexibility supports diverse learning styles.

Expert Insights: The solutions are prepared by subject experts from Physics Wallah, ensuring that the explanations are accurate, concise and aligned with the curriculum. This enhances the quality of study materials available to students.

Foundation for Advanced Topics: Mastering the concepts in this exercise lays a strong foundation for more advanced topics in geometry and trigonometry, which students will encounter in higher classes.