RD SHARMA
Solutions
Class 10 Maths
Chapter 4
Ex 4.3

Q.1) In a ΔΔ ABC, AD is the bisector of ∠∠ A , meeting side BC at D.

(i) if BD = 2.5 cm, AB = 5 cm, and AC = 4.2 cm, find DC.

(ii) if BD = 2 cm, AB = 5 cm, and DC = 3 cm, find AC.

(iii) if AB = 3.5 cm, AC = 4.2 cm, and DC = 2.8 cm, find BD.

(iv) if AB = 10 cm, AC = 14 cm, and BC = 6 cm, find BD and DC.

(v) if AC = 4.2 cm, DC = 6 cm, and BC = 10 cm, find AB.

(vi) if AB = 5.6 cm, BC = 6 cm, and DC = 3 cm, find BC.

(vii) if AB = 5.6 cm, BC = 6 cm, and BD = 3.2 cm, find AC.

(viii) if AB = 10 cm, AC = 6 cm, and BC = 12 cm, find BD and DC.

Sol:

(i) It is given that BD = 2.5 cm, AB = 5 cm, and AC = 4.2 cm.

In ΔΔ ABC, AD is the bisector of ∠∠ A , meeting side BC at D.

We need to find DC,

Since, AD is ∠∠ A bisector,

Then, $\frac{AB}{AC} = \frac{2.5}{DC}$

$\frac{5}{4.2} = \frac{2.5}{DC}$

5DC = 4.2 x 2.5

DC = (4.2 x 2.5)/5

DC = 2.1

(ii) It is given that BD = 2 cm, AB = 5 cm, and DC = 3 cm

In ΔΔ ABC, AD is the bisector of ∠∠ A, meeting side BC at D

We need to find AC.

Since, AD is ∠∠ A bisector.

Therefore, $\frac{AB}{AC} = \frac{BD}{DC}$ (since AD is the bisector of ∠∠ A and side BC)

Then, $5AC = 23 \frac{5}{AC} = \frac{2}{3}$

2AC = 5 x 3

AC = 15/2

AC = 7.5 cm

(iii) It is given that AB = 3.5 cm, AC = 4.2 cm, and DC = 2.8 cm

In $\Delta\Delta$ ABC, AD is the bisector of $\angle\angle$ A, meeting side BC at D

We need to find BD.

Since, AD is $\angle\angle$ A bisector

Therefore, $ABAC = BDDC \frac{AB}{AC} = \frac{BD}{DC}$ (since, AD is the bisector of $\angle\angle$ A and side BC)

Then, $3.54.2 = BD2.8 \frac{3.5}{4.2} = \frac{BD}{2.8}$

BD = (3.5 x 2.8)/4.2

BD = 7/3

BD = 2.3 cm

(iv) It is given that AB = 10 cm, AC = 14 cm, and BC = 6 cm

In $\Delta\Delta$ ABC, AD is the bisector of $\angle\angle$ A meeting side BC at D

We need to find BD and DC.

Since, AD is bisector of $\angle\angle$ A

Therefore, $ABAC = BDDC \frac{AB}{AC} = \frac{BD}{DC}$ (AD is bisector of $\angle\angle$ A and side BC)

Then, $1014 = x6-x \frac{10}{14} = \frac{x}{6-x}$

14x = 60 – 6x

20x = 60

x = 60/20

BD = 3 cm and DC = 3 cm.

(v) It is given that AC = 4.2 cm, DC = 6 cm, and BC = 10 cm.

In $\Delta\Delta$ ABC, AD is the bisector of $\angle\angle$ A, meeting side BC at D.

We need to find out AB,

Since, AD is the bisector of $\angle\angle$ A

Therefore, ACAB = DCBD $\frac{AC}{AB} = \frac{DC}{BD}$

Then, 4.2AB = 64 $\frac{4.2}{AB} = \frac{6}{4}$

6AB = 4.2 x 4

AB = (4.2 x 4)/6

AB = 16.8/6

AB = 2.8 cm

(vi) It is given that AB = 5.6 cm, BC = 6 cm, and DC = 3 cm

In $\Delta\Delta$ ABC, AD is the bisector of $\angle\angle$ A, meeting side BC at D

We need to find BC,

Since, AD is the $\angle\angle$ A bisector

Therefore, ACAB = BDDC $\frac{AC}{AB} = \frac{BD}{DC}$

Then, 65.6 = 3DC $\frac{6}{5.6} = \frac{3}{DC}$

DC = 2.8 cm

And, BC = 2.8 + 3

BC = 5.8 cm

(vii) It is given that AB = 5.6 cm, BC = 6 cm, and BD = 3.2 cm

In $\Delta\Delta$ ABC, AD is the bisector of $\angle\angle$ A , meeting side BC at D

Therefore, ABAC = BDDC $\frac{AB}{AC} = \frac{BD}{DC}$

5.6AC = 3.22.8 $\frac{5.6}{AC} = \frac{3.2}{2.8}$ (DC = BC – BD)

AC = (5.6 x 2.8)/3.2

AC = 4.9 cm

(viii) It is given that AB = 10 cm, AC = 6 cm, and BC = 12 cm

In $\Delta\Delta$ ABC, AD is the $\angle\angle$ A bisector, meeting side BC at D.

We need to find BD and DC

Since, AD is bisector of $\angle\angle$ A

So, ACAB = DCBD $\frac{AC}{AB} = \frac{DC}{BD}$

Let BD = x cm

Then,

610 = 12–xx $\frac{6}{10} = \frac{12-x}{x}$

6x = 120 – 10x

16x = 120

x = 120/16

x = 7.5

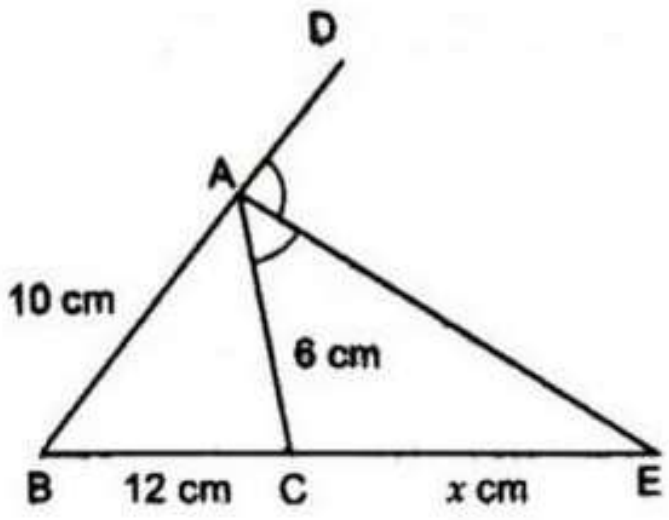
Now, DC = 12 – BD

DC = 12 – 7.5

DC = 4.5

BD = 7.5 cm and DC = 4.5 cm.

Q2.) AE is the bisector of the exterior $\angle\angle$CAD meeting BC produced in E. If AB = 10 cm, AC = 6 cm, and BC = 12 cm, Find CE.



Sol:

It is given that AE is the bisector of the exterior ∠∠CAD

Meeting BC produced E and AB = 10 cm, AC = 6 cm, and BC = 12 cm.

Since AE is the bisector of the exterior ∠∠CAD.

So, BECE=ABAC $\frac{BE}{CE} = \frac{AB}{AC}$

12+xx=10x $\frac{12+x}{x} = \frac{10}{x}$

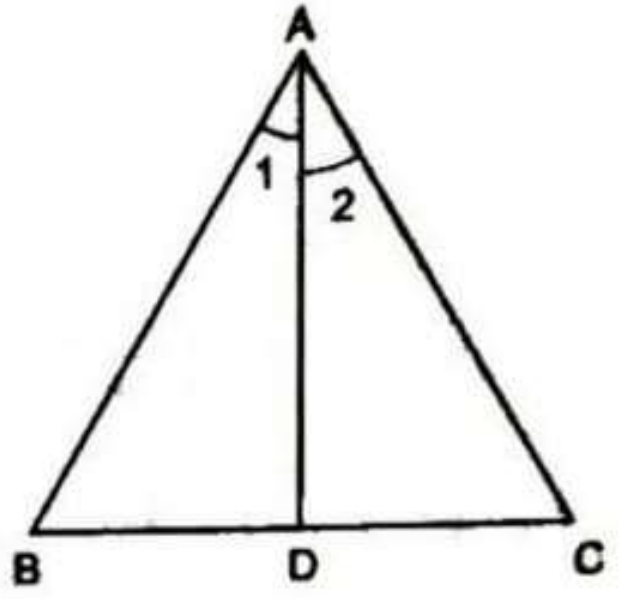
72 + 6x = 10x

4x = 72

x = 18

CE = 18 cm

Q.3) ΔΔ ABC is a triangle such that ABAC=BDDC $\frac{AB}{AC} = \frac{BD}{DC}$, ∠∠B = 70, ∠∠C = 50, find ∠∠BAD.



Sol:

It is given that in ΔΔ ABC, ABAC=BDDC $\frac{AB}{AC} = \frac{BD}{DC}$, ∠∠B = 70 and ∠∠C = 50

We need to find ∠∠ BAD

In ΔΔ ABC,

∠∠A = 180 – (70 + 50)

= 180 – 120

= 60

Since, ABAC = BDDC $\frac{AB}{AC} = \frac{BD}{DC}$

Therefore, AD is the bisector of ∠∠A

Hence, ∠∠BAD = 60/2 = 30

Q.4) Check whether AD is the bisector of ∠∠A of ΔΔ ABC in each of the following :

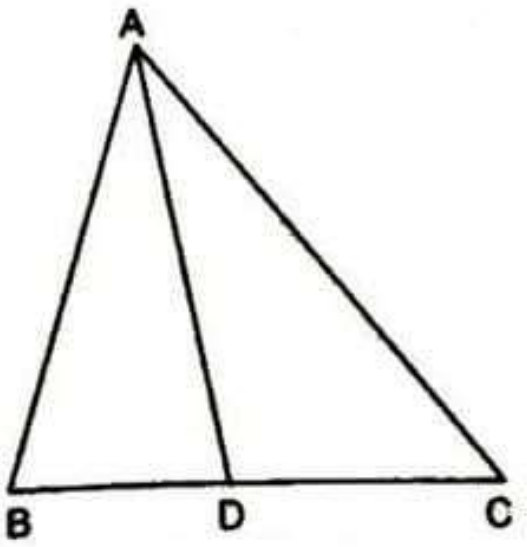
(i) AB = 5 cm, AC = 10 cm, BD = 1.5 cm and CD = 3.5 cm

(ii) AB = 4 cm, AC = 6 cm, BD = 1.6 cm and CD = 2.4 cm

(iii) AB = 8 cm, AC = 24 cm, BD = 6 cm and BC = 24 cm

(iv) AB = 6 cm, AC = 8 cm, BD = 1.5 cm and CD = 2 cm

(v) AB = 5 cm, AC = 12 cm, BD = 2.5 cm and BC = 9 cm



Sol:

(i) It is given that AB = 5 cm, AC = 10 cm, BD = 1.5 cm and CD = 3.5 cm

We have to check whether AD is bisector of ∠∠ A

First we will check proportional ratio between sides.

Now,

$ABAC = 510 = 12\ \frac{AB}{AC} = \frac{5}{10} = \frac{1}{2}$ $BDCD = 1.53.5 = 37\ \frac{BD}{CD} = \frac{1.5}{3.5} = \frac{3}{7}$

Since, $ABAC \neq BDCD\ \frac{AB}{AC} \neq \frac{BD}{CD}$

Hence, AD is not the bisector of ∠∠ A.

(ii) It is given that AB = 4 cm, AC = 6 cm, BD = 1.6 cm and CD = 2.4 cm.

We have to check whether AD is the bisector of ∠∠ A

First we will check proportional ratio between sides.

So, $ABAC = BDDC\ \frac{AB}{AC} = \frac{BD}{DC}$

$46 = 1.62.4\ \frac{4}{6} = \frac{1.6}{2.4}$

$23 = 23\ \frac{2}{3} = \frac{2}{3}$ (it is proportional)

Hence, AD is the bisector of ∠∠ A.

(iii) It is given that AB = 8 cm, AC = 24 cm, BD = 6 cm and BC = 24 cm.

We have to check whether AD is the bisector of ∠∠ A

First we will check proportional ratio between sides.

DC = BC – BD

DC = 24 – 6

DC = 18

So, $ABAC = BDDC\ \frac{AB}{AC} = \frac{BD}{DC}$

$824 = 618\ \frac{8}{24} = \frac{6}{18}$

$13 = 13\frac{1}{3} = \frac{1}{3}$ (it is proportional)

Hence, AD is the bisector of ∠∠ A.

(iv) It is given that AB = 6 cm, AC = 8 cm, BD = 1.5 cm and CD = 2 cm.

We have to check whether AD is the bisector of ∠∠ A

First, we will check proportional ratio between sides.

So, $ABAC = BDDC \frac{AB}{AC} = \frac{BD}{DC}$

$68 = 1.52 \frac{6}{8} = \frac{1.5}{2}$

$34 = 34 \frac{3}{4} = \frac{3}{4}$ (it is proportional)

Hence, AD is the bisector of ∠∠ A.

(v) It is given that AB = 5 cm, AC = 12 cm, BD = 2.5 cm and BC = 9 cm.

We have to check whether AD is the bisector of ∠∠ A

First, we will check proportional ratio between sides.

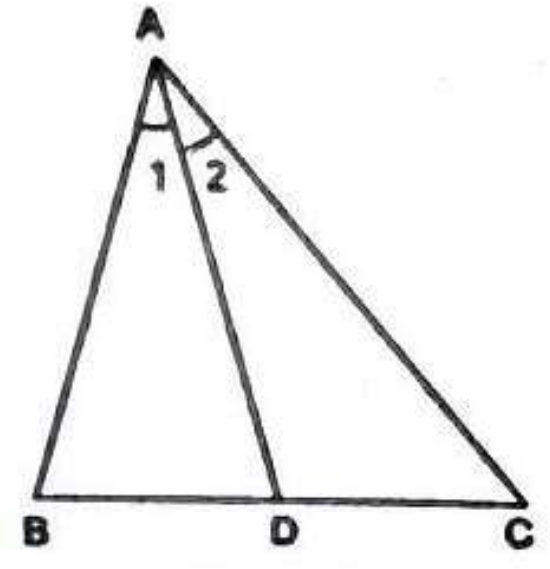
So, $ABAC = 512 \frac{AB}{AC} = \frac{5}{12}$

$BDCD = 2.59 = 518 \frac{BD}{CD} = \frac{2.5}{9} = \frac{5}{18}$

Since, $ABAC \neq BDCD \frac{AB}{AC} \neq \frac{BD}{CD}$

Hence, AD is not the bisector of ∠∠ A.

Q.5) In fig. AD bisects ∠∠A, AB = 12 cm, AC = 20 cm, and BD = 5 cm, determine CD.



Soln.: It is given that AD bisects ∠∠ A

AB = 12 cm, AC = 20 cm, and BD = 5 cm.

We need to find CD.

Since AD is the bisector of ∠∠ A

then, ABAC = BDDC $\frac{AB}{AC} = \frac{BD}{DC}$

1220 = 5DC $\frac{12}{20} = \frac{5}{DC}$

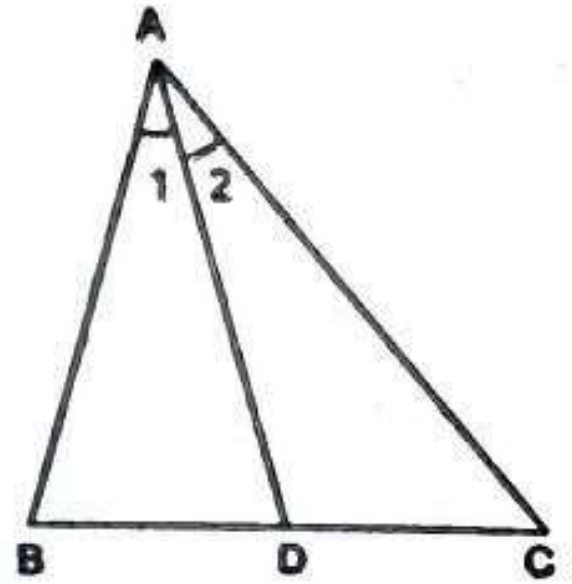
12 x DC = 20 x 5

DC = 100/12

DC = 8.33 cm

∴ CD = 8.33 cm.

Q6.) In ΔΔ ABC, if ∠∠1 = ∠∠2, prove that, ABAC = BDDC $\frac{AB}{AC} = \frac{BD}{DC}$



Sol: We need to prove that, $\triangle ABAC = \triangle BDDC$ $\frac{AB}{AC} = \frac{BD}{DC}$

In $\Delta\Delta$ ABC,

$\angle\angle 1 = \angle\angle 2$

So, AD is the bisector of $\angle\angle A$

Therefore,

$\triangle ABAC = \triangle BDDC$ $\frac{AB}{AC} = \frac{BD}{DC}$

Q.7) D and E are the points on sides BC, CA and AB respectively. of a $\Delta\Delta$ ABC such that AD bisects $\angle\angle A$, BE bisects $\angle\angle B$ and CF bisects $\angle\angle C$. If AB = 5 cm, BC = 8 cm, and CA = 4 cm, determine AF, CE, and BD.

Sol:

It is given that AB = 5 cm, BC = 8 cm and CA = 4 cm.

We need to find out, AF, CE and BD.

Since, AD is the bisector of $\angle\angle A$

$\triangle ABAC = \triangle BDCD$ $\frac{AB}{AC} = \frac{BD}{CD}$

Then,

$54 = BDBC–BD \frac{5}{4} = \frac{BD}{BC–BD}$ $54 = BD8–BD \frac{5}{4} = \frac{BD}{8–BD}$

40 – 5BD = 4 BD

9BD = 40

So, BD = 40/9

Since, BE is the bisector of ∠∠ B

So, $ABBC = AEEC \frac{AB}{BC} = \frac{AE}{EC}$

$ABBC = AC–ECEC \frac{AB}{BC} = \frac{AC–EC}{EC}$ $58 = 4–CECE \frac{5}{8} = \frac{4–CE}{CE}$

5CE = 32 – 8CE

5CE + 8CE = 32

13CE = 32

So, CE = $3213 \frac{32}{13}$

Now, since, CF is the bisector of ∠∠C

So, $BCCA = BFAF \frac{BC}{CA} = \frac{BF}{AF}$

$84 = AB–AFAF \frac{8}{4} = \frac{AB–AF}{AF}$ $84 = 5–AFAF \frac{8}{4} = \frac{5–AF}{AF}$

8AF = 20 – 4AF

12AF = 20

So, 3AF = 5

AF = 5/3 cm, CE = 32/12 cm

and BD = 40/9 cm