Exercise 4.3

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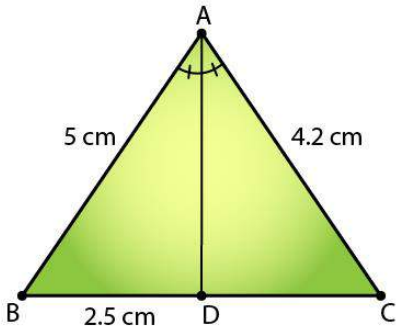
1. In a Δ ABC, AD is the bisector of ∠ A, meeting side BC at D.
(i) if BD = 2.5 cm, AB = 5 cm, and AC = 4.2 cm, find DC.
Solution:

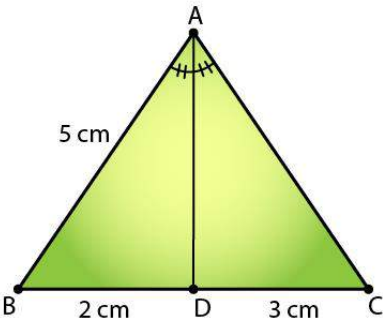
Given: Δ ABC and AD bisects ∠A, meeting side BC at D. And BD = 2.5 cm, AB = 5 cm, and AC = 4.2 cm.
Required to find: DC



Since, AD is the bisector of ∠ A meeting side BC at D in Δ ABC
⇒ AB/ AC = BD/ DC
5/ 4.2 = 2.5/ DC
5DC = 2.5 x 4.2
∴ DC = 2.1 cm

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

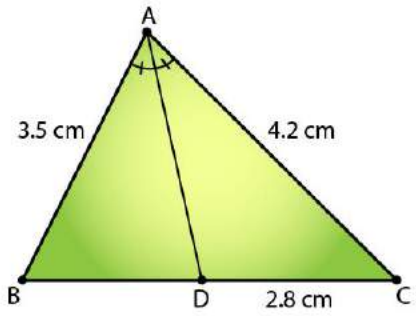
Given: Δ ABC and AD bisects ∠A, meeting side BC at D. And BD = 2 cm, AB = 5 cm, and DC = 3 cm.
Required to find: AC



Since, AD is the bisector of ∠ A meeting side BC at D in Δ ABC
⇒ AB/ AC = BD/ DC
5/ AC = 2/ 3
2AC = 5 x 3
∴ AC = 7.5 cm

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

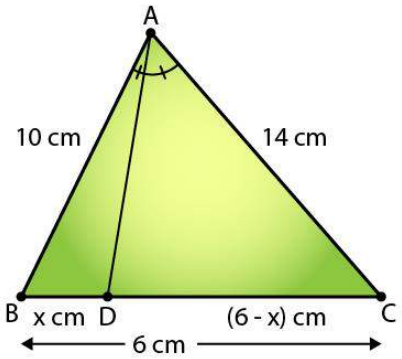
Given: Δ ABC and AD bisects ∠A, meeting side BC at D. And AB = 3.5 cm, AC = 4.2 cm, and DC = 2.8 cm.
Required to find: BD



Since, AD is the bisector of ∠ A meeting side BC at D in Δ ABC
⇒ AB/ AC = BD/ DC
3.5/ 4.2 = BD/ 2.8
4.2 x BD = 3.5 x 2.8
BD = 7/3
∴ BD = 2.3 cm

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

Given: In Δ ABC, AD is the bisector of ∠A meeting side BC at D. And, AB = 10 cm, AC = 14 cm, and BC = 6 cm
Required to find: BD and DC.

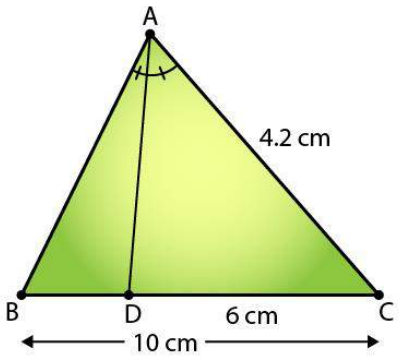


Since, AD is bisector of ∠A
We have,
AB/AC = BD/DC (AD is bisector of ∠ A and side BC)
Then, 10/ 14 = x/ (6 – x)
14x = 60 – 6x
20x = 60

x = 60/20
∴ BD = 3 cm and DC = (6 – 3) = 3 cm.

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

Given: Δ ABC and AD bisects ∠A, meeting side BC at D. And AC = 4.2 cm, DC = 6 cm, and BC = 10 cm.
Required to find: AB

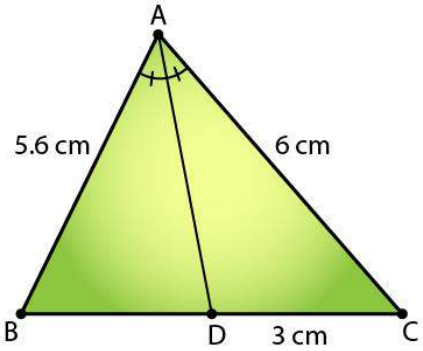


Since, AD is the bisector of ∠ A meeting side BC at D in Δ ABC
⇒ AB/ AC = BD/ DC
AB/ 4.2 = BD/ 6
We know that,
BD = BC – DC = 10 – 6 = 4 cm

⇒ AB/ 4.2 = 4/ 6
AB = (2 x 4.2)/ 3
∴ AB = 2.8 cm

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

Given: Δ ABC and AD bisects ∠A, meeting side BC at D. And AB = 5.6 cm, AC = 6 cm, and DC = 3 cm.
Required to find: BC



Since, AD is the bisector of ∠ A meeting side BC at D in Δ ABC

⇒ AB/ AC = BD/ DC

5.6/ 6 = BD/ 3

BD = 5.6/ 2 = 2.8cm

And, we know that,

BD = BC – DC

2.8 = BC – 3

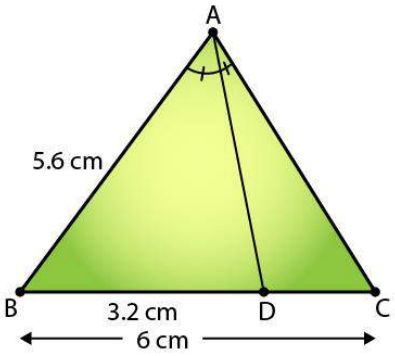
∴ BC = 5.8 cm

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

Solution:

Given: Δ ABC and AD bisects ∠A, meeting side BC at D. And AB = 5.6 cm, BC = 6 cm, and BD = 3.2 cm.

Required to find: AC



Since, AD is the bisector of ∠ A meeting side BC at D in Δ ABC

⇒ AB/ AC = BD/ DC

5.6/ AC = 3.2/ DC

And, we know that

BD = BC – DC

3.2 = 6 – DC

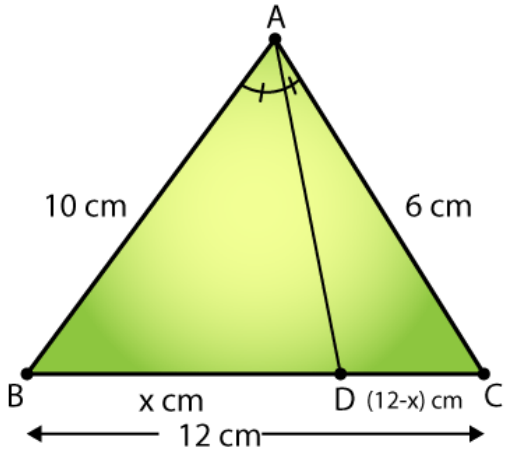
∴ DC = 2.8 cm

⇒ 5.6/ AC = 3.2/ 2.8

AC = (5.6 x 2.8)/ 3.2
∴ AC = 4.9 cm

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

Given: Δ ABC and AD bisects ∠A, meeting side BC at D. AB = 10 cm, AC = 6 cm, and BC = 12 cm.
Required to find: DC



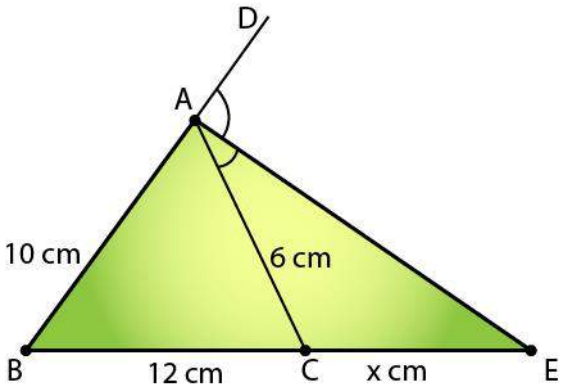
Since, AD is the bisector of ∠ A meeting side BC at D in Δ ABC
⇒ AB/ AC = BD/ DC
10/ 6 = BD/ DC …….. (i)
And, we know that
BD = BC – DC = 12 – DC
Let BD = x,
⇒ DC = 12 – x

Thus (i) becomes,
10/ 6 = x/ (12 - x)
5(12 – x) = 3x
60 -5x = 3x
∴ x = 60/8 = 7.5

Hence, DC = 12 – 7.5 = 4.5cm and BD = 7.5 cm

2. In figure 4.57, AE is the bisector of the exterior ∠CAD meeting BC produced in E. If AB = 10 cm, AC = 6 cm, and BC = 12 cm, find CE.
Solution:

Given: AE is the bisector of the exterior ∠CAD and AB = 10 cm, AC = 6 cm, and BC = 12 cm.
Required to find: CE



Since AE is the bisector of the exterior ∠CAD.

BE / CE = AB / AC

Let's take CE as x.

So, we have

BE/ CE = AB/ AC

(12+x)/ x = 10/ 6

6x + 72 = 10x

10x - 6x = 72

4x = 72

∴ x = 18

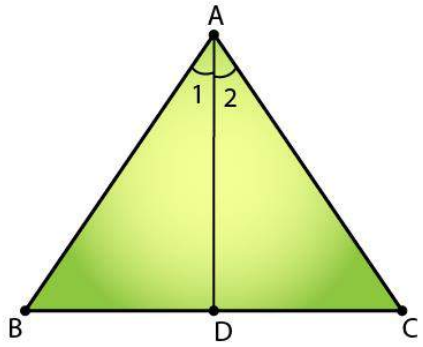
Therefore, CE = 18 cm.

3. In fig. 4.58, Δ ABC is a triangle such that AB/AC = BD/DC, ∠B=70º, ∠C = 50º, find ∠BAD.

Solution:

Given: Δ ABC such that AB/AC = BD/DC, ∠B = 70º and ∠C = 50º

Required to find: ∠BAD



We know that,

In ΔABC,

∠A = 180 – (70 + 50) [Angle sum property of a triangle]

= 180 – 120

= 60º

Since,

AB/AC = BD/DC,

AD is the angle bisector of angle ∠A.

Thus,

∠BAD = ∠A/2 = 60/2 = 30^o