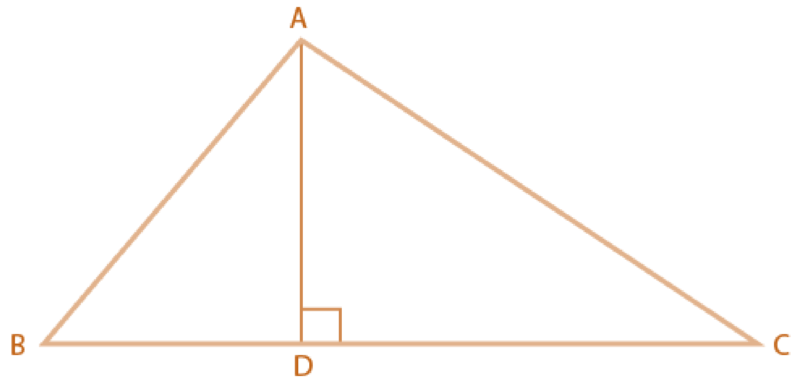
EXERCISE 6.1

1. In figure, if ∠BAC =90° and AD ⊥ BC. Then,

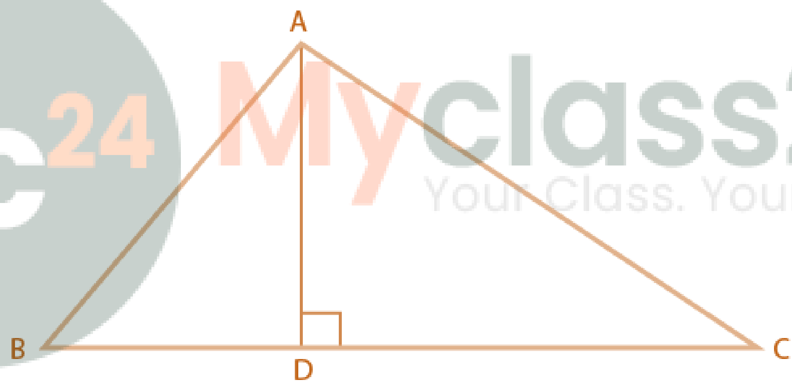
(a) BD.CD = BZC²   (b) AB.AC = BC²   (c) BD.CD=AD²   (d) AB.AC =AD²



Solution:

c) BD.CD=AD²

Explanation:



From ΔADB and ΔADC,
According to the question, we have,
∠D = ∠D = 90° (∵ AD ⊥ BC)
∠DBA = ∠DAC [each angle = 90°- ∠C]
Using AAA similarity criteria,
ΔADB ~ ΔADC
BD/AD = AD/CD
BD.CD = AD^2

2. If the lengths of the diagonals of rhombus are 16 cm and 12 cm. Then, the length of the sides of the rhombus is

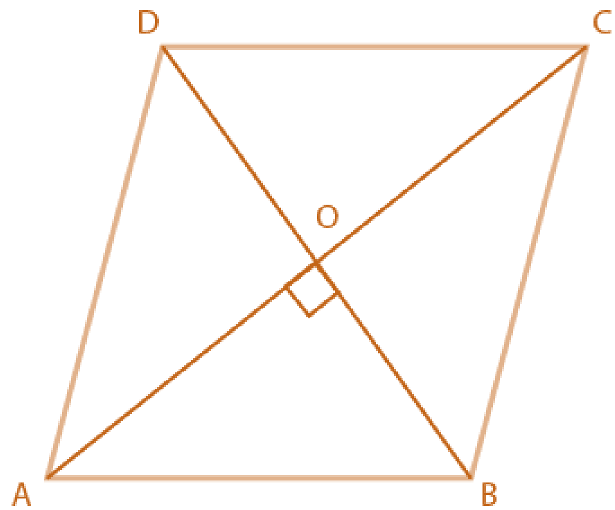
(a) 9 cm   (b) 10 cm   (c) 8 cm   (d) 20 cm

Solution:

(b) 10 cm

Explanation:

We know that,
A rhombus is a simple quadrilateral whose four sides are of same length and diagonals are perpendicular bisector of each other.
According to the question, we get,



According to the question,
AC = 16 cm and BD = 12 cm
∠AOB = 90°
∵ AC and BD bisects each other
AO = ½ AC and BO = ½ BD
Then, we get,
AO = 8 cm and BO = 6 cm
Now, in right angled ΔAOB,
Using the Pythagoras theorem,
We have,
$AB^2 = AO^2 + OB^2$
$AB^2 = 8^2 + 6^2 = 64 + 36 = 100$
∴ AB = √100 = 10 cm
We know that the four sides of a rhombus are equal.
Therefore, we get,
one side of rhombus = 10 cm.

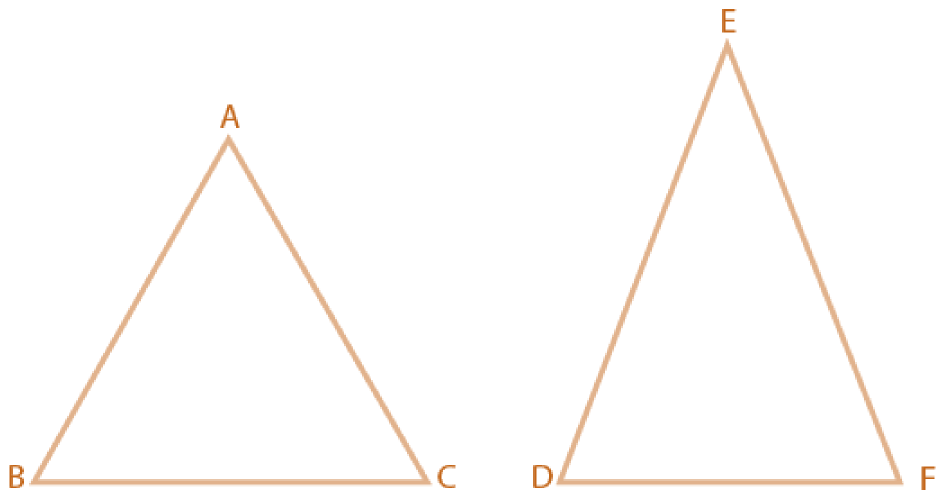
3. If ΔABC ~ ΔEDF and ΔABC is not similar to ΔDEF, then which of the following is not true?

(a) BC · EF = AC · FD **(b) AB · EF = AC · DE**
(c) BC · DE = AB · EF **(d) BC · DE = AB · FD**

Solution:

(c) BC · DE = AB · EF

Explanation:
We know that,
If sides of one triangle are proportional to the side of the other triangle, and the corresponding angles are also equal, then the triangles are similar by SSS similarity.



So, ΔABC ~ ΔEDF
Using similarity property,
AB/ED = BC/DF = AC/EF
Taking AB/ED = BC/DF, we get
AB/ED = BC/DF
AB.DF = ED.BC
So, option (d) BC · DE = AB · FD is true
Taking BC/DF = AC/EF, we get
BC/DF = AC/EF
⇒ BC.EF = AC.DF
So, option (a) BC · EF = AC · FD is true
Taking AB/ED = AC/EF, we get,
AB/ED = AC/EF
AB.EF = ED.AC
So, option (b) AB · EF = AC · DE is true.

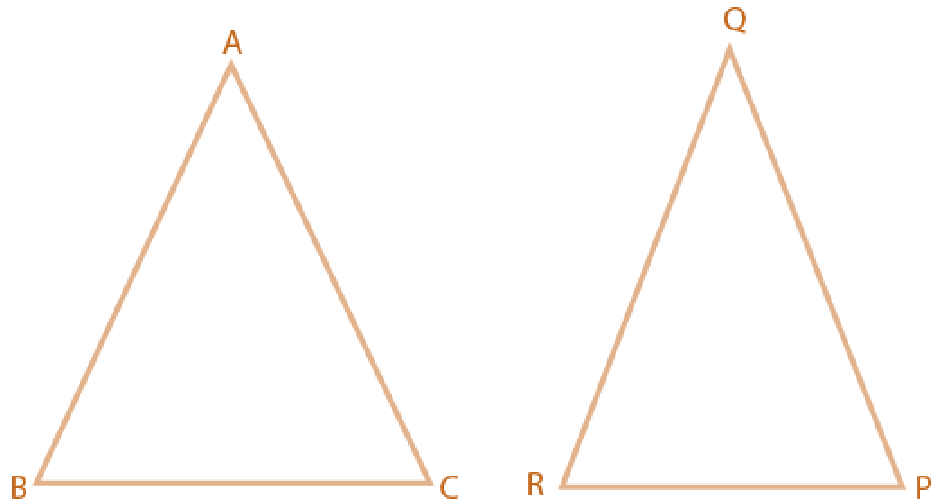
4. If in two Δ PQR,AB/QR = BC/PR = CA/PQ, then

(a)Δ PQR~Δ CAB **(b) Δ PQR ~ Δ ABC**
(c)Δ CBA ~ Δ PQR **(d) Δ BCA ~ Δ PQR**

Solution:

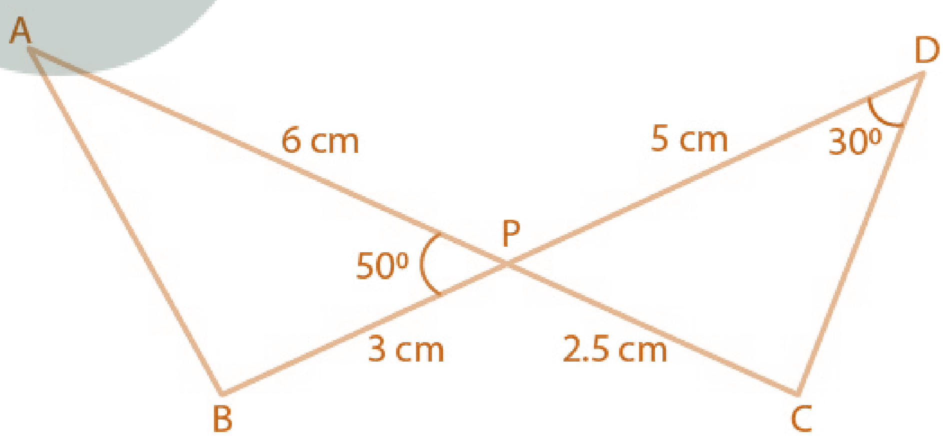
(a)Δ PQR~Δ CAB

<u>Explanation:</u>



From ΔABC and ΔPQR, we have,
AB/QR = BC/PR = CA/PQ
If sides of one triangle are proportional to the side of the other triangle, and their corresponding angles are also equal, then both the triangles are similar by SSS similarity.
Therefore, we have,
Δ PQR~Δ CAB

5. In figure, two line segments AC and BD intersect each other at the point P such that PA = 6 cm, PB = 3 cm, PC = 2.5 cm, PD = 5 cm, ∠APB = 50° and ∠CDP = 30°. Then, ∠PBA is equal to
(a) 50° **(b) 30°** **(c) 60°** **(d) 100°**



Solution:
(d) 100°
Explanation:
From ΔAPB and ΔCPD,
∠APB = ∠CPD = 50° (since they are vertically opposite angles)

AP/PD = 6/5 … (i)
Also, BP/CP = 3/2.5
Or BP/CP = 6/5 … (ii)
From equations (i) and (ii),
We get,
AP/PD = BP/CP
So, ΔAPB ~ ΔDPC [using SAS similarity criterion]
∴ ∠A = ∠D = 30° [since, corresponding angles of similar triangles]
Since, Sum of angles of a triangle = 180°,
In ΔAPB,
∠A + ∠B + ∠APB = 180°
So, 30° + ∠B + 50° = 180°
Then, ∠B = 180° - (50° + 30°)
∠B = 180 – 80° = 100°
Therefore, ∠PBA = 100°