Triangles Ex 4.6 Q3

Answer :

Given: The area of two similar triangles is $81cm^2$ and $49cm^2$ respectively.

To find:

(1) Ratio of their corresponding heights.

(2) Ratio of their corresponding medians.

(1) We know that the ratio of areas of two similar triangles is equal to the ratio of squares of their corresponding altitudes.

$$\frac{ar(\text{triangle1})}{ar(\text{triangle2})}=\left(\frac{\text{altitude1}}{\text{altitude2}}\right)^2$$

$$\frac{81}{49}=\left(\frac{\text{altitude1}}{\text{altitude2}}\right)^2$$

Taking square root on both sides, we get

$$\frac{9}{7}=\frac{\text{altitude1}}{\text{altitude2}}$$

$$\boxed{\text{altitude1}:\text{altitude2}=9:7}$$

(2) We know that the ratio of areas of two similar triangles is equal to the ratio of squares of their medians.

$$\frac{ar(\text{triangle1})}{ar(\text{triangle2})}=\left(\frac{\text{median1}}{\text{median2}}\right)^2$$

$$\frac{81}{49}=\left(\frac{\text{median1}}{\text{median2}}\right)^2$$

Taking square root on both sides, we get

$$\frac{9}{7}=\frac{\text{median1}}{\text{median2}}$$

$$\boxed{\text{median1}:\text{median2}=9:7}$$

Triangles Ex 4.6 Q4

Answer :

Given: The area of two similar triangles is $169cm^2$ and $121cm^2$ respectively.The longest side of the larger triangle is 26cm.

To find: Longest side of the smaller triangle

We know that the ratio of areas of two similar triangles is equal to the ratio of squares of their corresponding sides.

$$\frac{ar(\text{larger triangle})}{ar(\text{smaller triangle})}=\left(\frac{\text{side of the larger triangle}}{\text{side of the smaller triangle}}\right)^2$$

$$\frac{169}{121}=\left(\frac{\text{side of the larger triangle}}{\text{side of the smaller triangle}}\right)^2$$

Taking square root on both sides, we get

$$\frac{13}{11}=\frac{\text{side of the larger triangle}}{\text{side of the smaller triangle}}$$

$$\frac{13}{11}=\frac{26}{\text{side of the smaller triangle}}$$

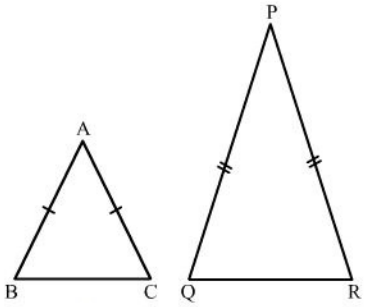
$$\text{side of the smaller triangle}=\frac{11\times 26}{13}=22\text{ cm}$$

Hence, the longest side of the smaller triangle is $\boxed{22\text{ cm}}$.

Triangles Ex 4.6 Q5

Answer :

Given: Two isosceles triangles have equal vertical angles and their areas are in the ratio of 36:25.
To find: Ratio of their corresponding heights.



Suppose ΔABC and ΔPQR are two isosceles triangles with $\angle \mathbf{A} = \angle \mathbf{P}$.

Now, AB = AC and PQ = PR

$\therefore \frac{\mathbf{AB}}{\mathbf{AC}} = \frac{\mathbf{PQ}}{\mathbf{PR}}$

In ΔABC and ΔPQR,

$\angle \mathbf{A} = \angle \mathbf{P}$

$\frac{\mathbf{AB}}{\mathbf{AC}} = \frac{\mathbf{PQ}}{\mathbf{PR}}$

∴ ΔABC ~ ΔPQR (SAS Similarity)

Let AD and PS be the altitudes of ΔABC and ΔPQR, respectively.
We know that the ratio of areas of two similar triangles is equal to the ratio of squares of their corresponding altitudes.

$\therefore \frac{\mathbf{ar}(\triangle \mathbf{ABC})}{\mathbf{ar}(\triangle \mathbf{PQR})} = \left(\frac{\mathbf{AD}}{\mathbf{PS}}\right)^2$

$\Rightarrow \frac{36}{25} = \left(\frac{\mathbf{AD}}{\mathbf{PS}}\right)^2$

$\Rightarrow \frac{\mathbf{AD}}{\mathbf{PS}} = \frac{6}{5}$

Hence, the ratio of their corresponding heights is 6 : 5.

********** END **********