MATHS

BOOKS - SWAN PUBLICATION

TRIANGLES

Exercise 6 1

1. Fill in the blanks using the correct word given in brackets :- All circles are ..... (congruent,similar)

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2. Fill in the blanks using the correct word given in brackets :- All squares are..... (similar,congruent) .

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3. Fill in the blanks using the correct word given in brackets :- All ..... Triangles are similar . (isosceles,equilateral).

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4. Fill in the blanks using the correct word given in brackets :- Two polygons of the same number of sides are similar, if :- their corresponding angles are..... (equal , proportional).

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5. Give two different examples of pair of

(i) similar figures (ii) non-similar figures.

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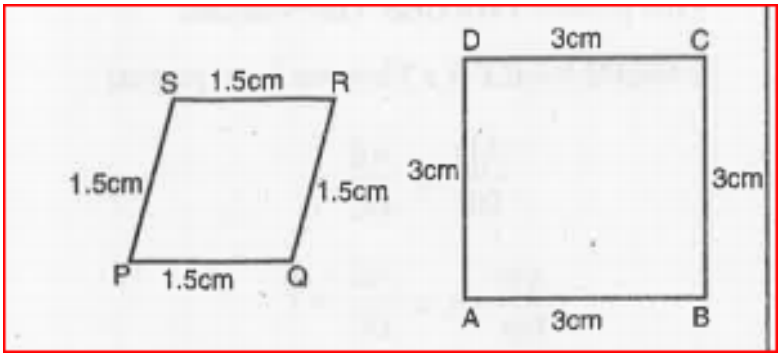
6. State whether the following quadrilaterals are similar or not :-



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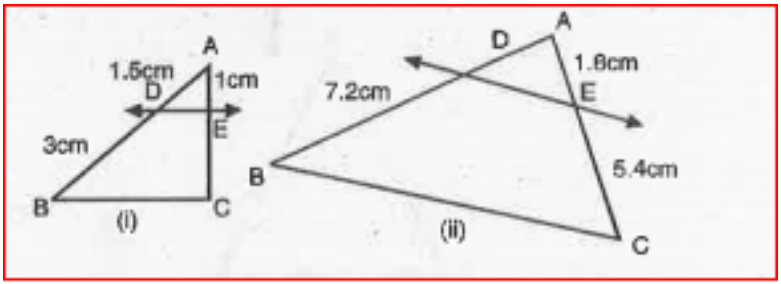
Exercise 6 2

1. In fig. (i) and (ii), DE || BC. Find EC in (i) and AD in (ii).



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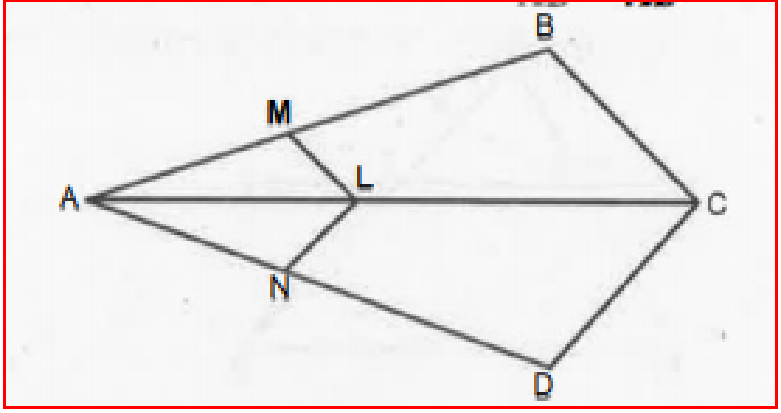
2. In fig., LM || CB , and LN||CD.Prove that $\frac{AM}{AB} = \frac{AN}{AD}$.



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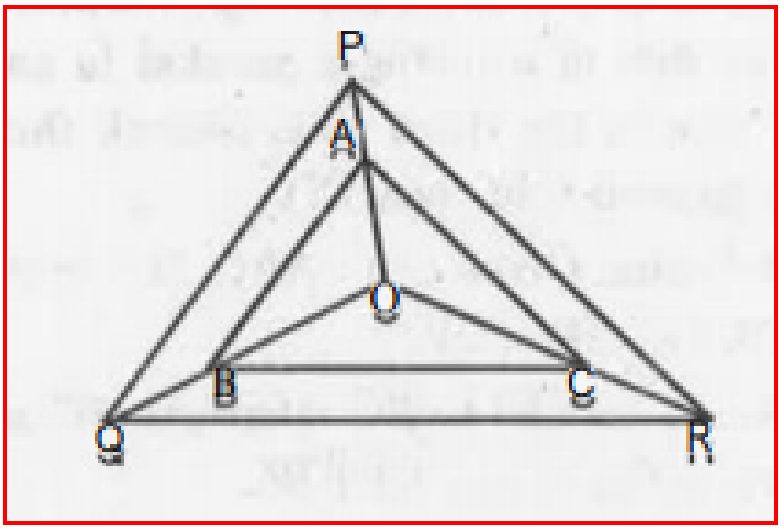
3. In fig., A, B and C are points on OP, OQ and OR respectively such that AB || PQ and AC || PR.

Show that BC || QR.



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4. Using Basic Proportionality theorem, prove thata line drawn through the mid-point of one side of a triangle parallel to another side

bisects the third side. (Recall that you have proved it in class IX).

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5. Using converse of Basic Proportionality theorem prove that the line joining the mid-points of any two sides of a triangle is parallel to the third side. (Recall that you have done it in Class IX).

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6. ABCD is a trapezium in which AB II DC and its diagonals intersect each other at the point O. show that $\frac{AO}{BO} = \frac{CO}{DO}$.

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7. The diagonals of a quadrilateral ABCD intersect each other at the point o Such that $\frac{AO}{BO} = \frac{CO}{DO}$, show that ABCD is trapezium.

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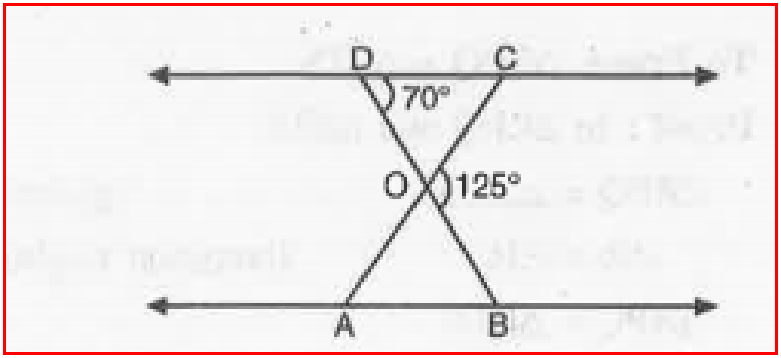
Exercise 6 3

1. In fig., $\triangle ODC - \triangle OBA$, $\angle BOC = 125 \circ 0$ and $\angle CDO = 70 \circ 0$. Find $\angle DOC, \angle DCO$ and $\angle OAB$.



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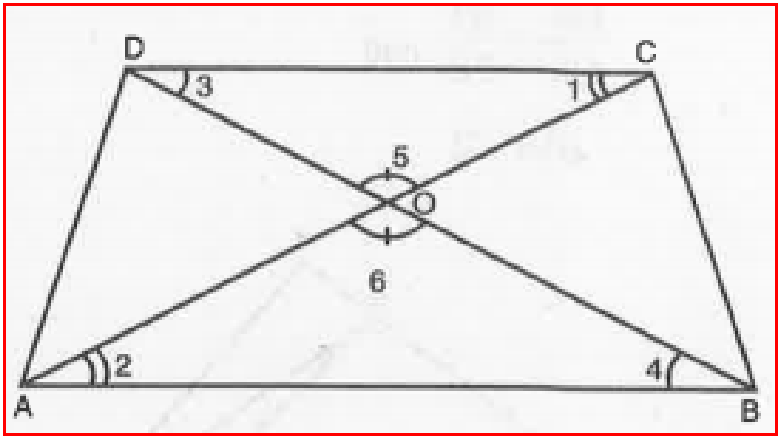
2. Diagonals AC and BD of a trapezium ABCD with AB || DC intersect each other at the point O. Using a similarity criterion for two triangles , show that $\frac{OA}{OC} = \frac{OB}{OD}$.



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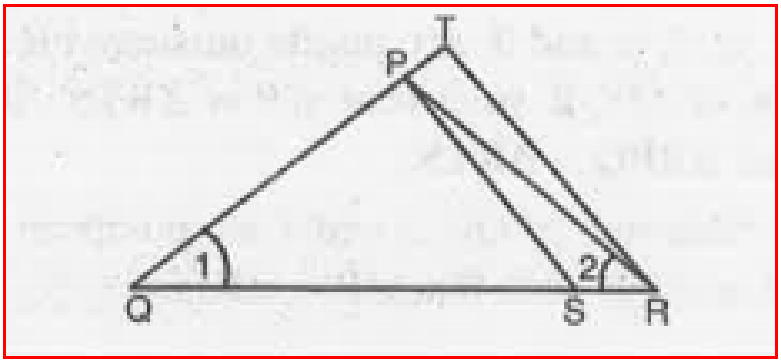
3. In fig., $\frac{QR}{QS} = \frac{QT}{PR}$ and $\angle 1 = \angle 2$. Show that $\triangle PQS \sim \triangle TQR$.



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4. S and T are points on sides PR and QR of $\triangle PQR$ such that $\angle P = \angle RTS$ .Show that $\triangle RPQ \sim \triangle RTS$.

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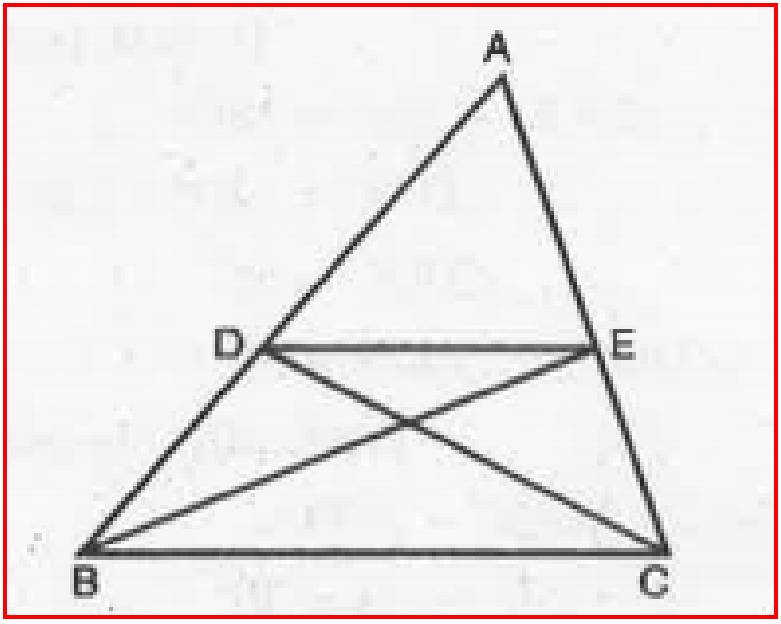
5. In figure $\triangle ABE = \triangle ACD$ show that $\triangle ADE \sim \triangle ABC$.



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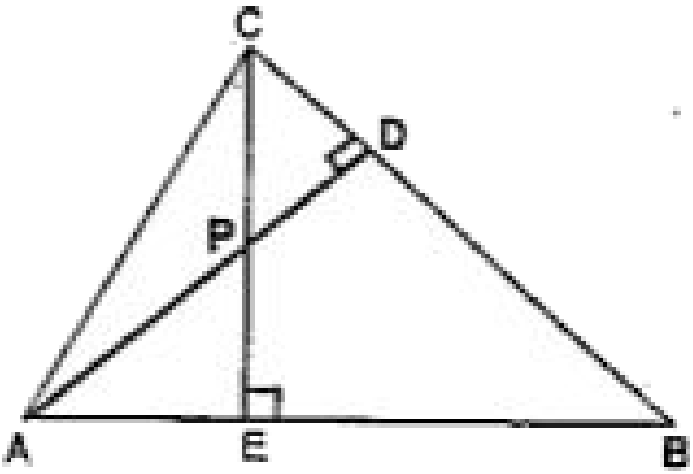
6. In Fig., altitudes AD and CE of $\triangle ABC$ intersect each other at the point P. Show that:

(i) $\triangle AEP \sim \triangle CDP$

(ii) $\triangle ABD \sim \triangle CBE$

(iii) $\triangle AEP \sim \triangle ADB$

(iv) $\triangle PDC \sim \triangle BEC$



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7. E is a point on the side AD produced of a parallelogram ABCD and BE intersects CD at F. Show that $\triangle ABE \sim \triangle CFB$.

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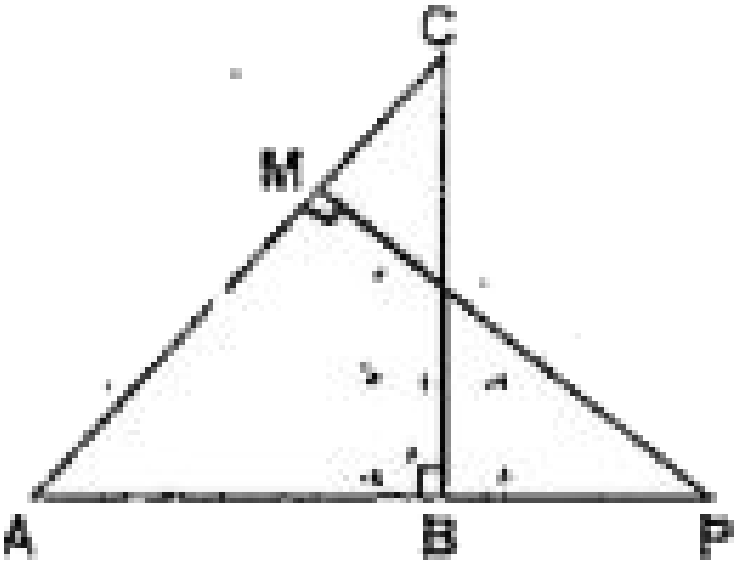
8. In Fig., ABC and AMP are two right triangles, right angled at B and M respectively. Prove that:

(i) $\triangle ABC \sim \triangle AMP$

(ii) $\frac{CA}{PA} = \frac{BC}{MP}$



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9. CD and GH are respectively the bisectors of $\angle ACB$ and $\angle EGF$ such that D and H lie on sides AB and FE of $\triangle ABC$ and $\triangle EFG$

respectively. If $\triangle ABC \sim \triangle FEG$, show that $\therefore \frac{CD}{GH} = \frac{AC}{FG}$.

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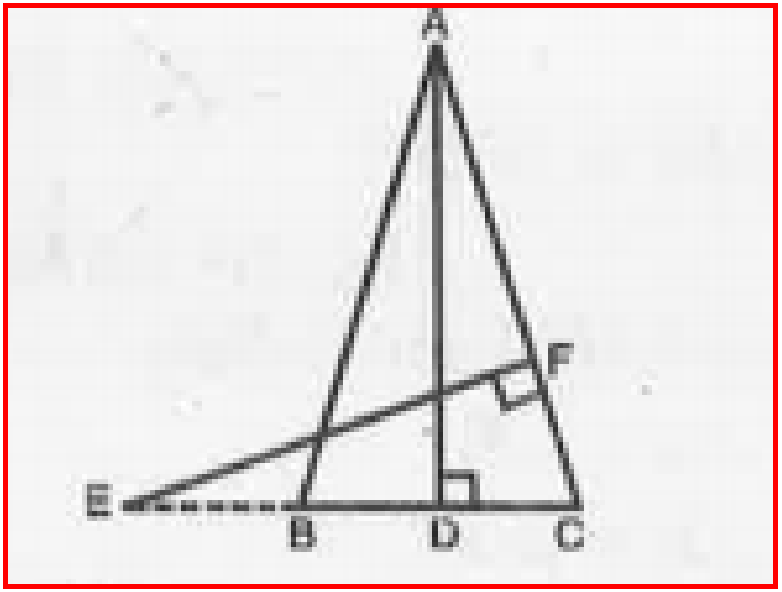
10. In Fig., E is a point on side CB produced of an isosceles triangle ABC with AB = AC. If AD $\perp$ BC and EF $\perp$ AC, prove that

$\triangle ABD \sim \triangle$ ECF.



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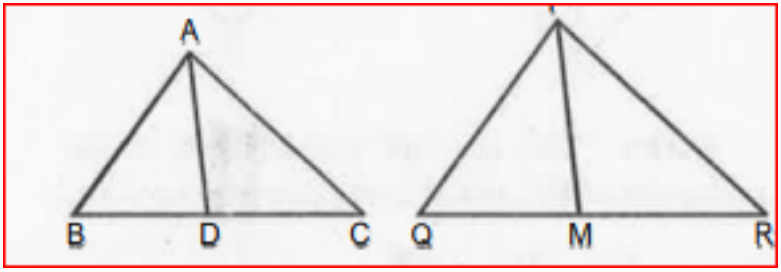
11. Sides AB and BC and median AD of a triangle ABC are respectively proportional to sides PQ and QR and median PM of $\triangle PQR$

(see Fig.). Show that $\triangle ABC \sim \triangle PQR$.



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12. D is a point on the side BC of a triangle ABC such that $\angle ADC = \angle BAC$. Show that $CA^2 = CB.CD$.

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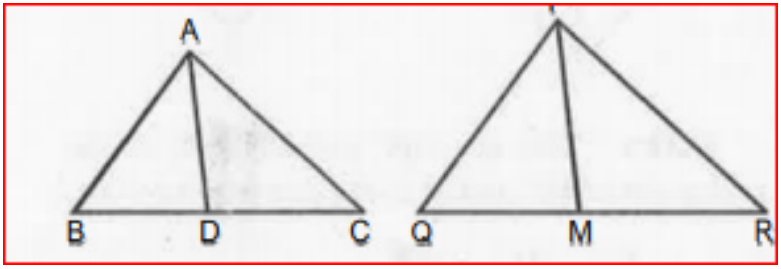
13. Sides AB and BC and median AD of a triangle ABC are respectively proportional to sides PQ and QR and median PM of $\triangle PQR$ (see Fig.). Show that $\triangle ABC \sim \triangle PQR$.



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14. A vertical pole of length 6 m casts a shadow 4 m long on the ground and at the

same time a tower casts a shadow 28 m long.

Find the height of the tower.

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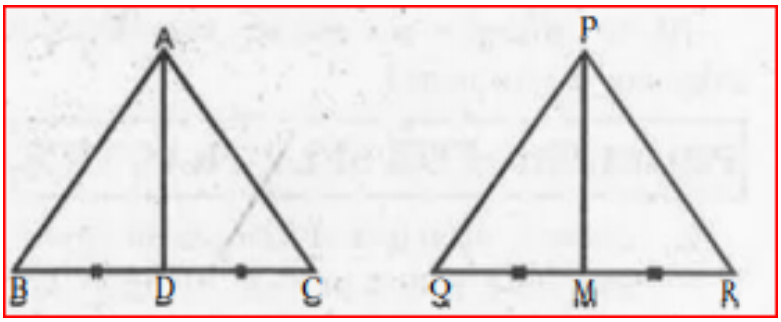
15. If AD and PM are medians of triangles ABC and PQR, respectively where $\triangle ABC \sim \triangle PQR$, Prove that $\frac{AB}{PQ} = \frac{AD}{PM}$.



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Exercise 6 4

1. Let $\Delta ABC \sim \Delta DEF$ and their areas be, respectively, 64 cm^2 and 121 cm^2. If EF = 15.4 cm, find BC.

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2. Diagonals of a trapezium ABCD with AB||DC intersect each other at the point O. If AB=2 CD,find the ratio of the areas of triangles AOB and COD.

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3. In Fig, ABCand DBC are lwo triangles on the same base BC. If AD intersects BC at O,show

that $\frac{ar(ABC)}{ar(DBC)} = \frac{AO}{DO}$.

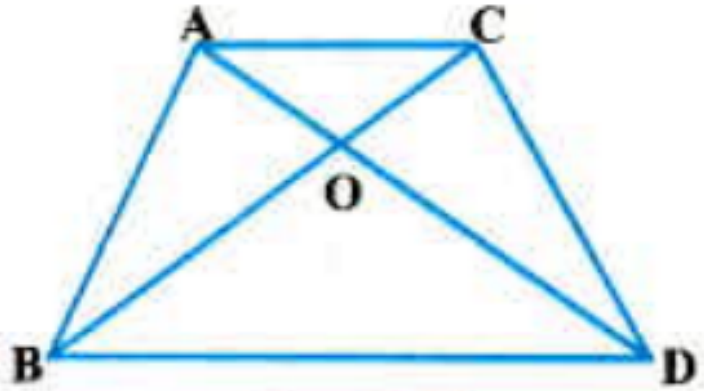

Fig. 6.44

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4. If the areas of two similar triangles are equal, prove that they are congruent.

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5. D, E and F are respectively the mid points of the sides BC, CA and AB of $\triangle ABC$. Determine the ratio of the areas of triangles DEF and ABC.

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6. Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding medians.

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7. Prove that the areas of the equilateral triangle described on the side of a square is equal to half the area of the equilateral triangle described on one of its diagonal.

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8. Tick the correct answer and justify : ABC and BDE are two equilateral triangles such that D

is the mid-point of BC. Ratio of the areas of triangles ABC and BDE is

A. $2:1$

B. $1:2$

C. $4:1$

D. $1:4$

Answer: C

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9. Tick the correct answer and justify : Sides of two similar triangles are in the ratio 4:9. Areas of these triangles are in the ratio

A. $2:3$

B. $4:9$

C. $81:16$

D. $16:81$

Answer: D

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Exercise 6 5

1. PQR is a triangle right angled at P and M is a point on QR such that PM $\perp$ QR. Show that PM^2 = QM.MR.

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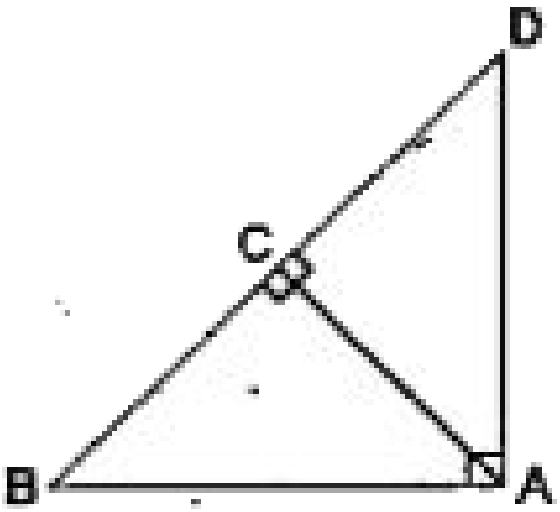
2. In Fig., ABD is a triangle right angled at A and $AC \perp BD$. Show that:

(i) $AB^2 = BC.BD$

(ii) $AC^2 = BC.DC$

(iii) $AD^2 = BD.CD$



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3. ABC is an isosceles triangle right angled at C. Prove that $AB^2 = 2AC^2$.

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4. ABC is an isosceles triangle with AC = BC. If $AB^2 = 2AC^2$, prove that ABC is right triangle.

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5. ABC is an equilateral triangle ofside 2a. Find each of its altitudes.

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6. Prove that the sum of the squares of the sides of a rhombus is equal to the sum of the squares of its diagonals.

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7. A ladder 10 m long reaches a window 8 m above the ground. Find the distance of the foot of the ladder from base of the wall.

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8. A guy wire attached to a vertical pole of height 18 m is 24 m long and has a stake attached to the other end. How far from the base of the pole should the stake be driven so that the wire will be taut ?

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9. An aeroplane leaves an airport and flies due north at a speed of 1000km per hour. At the same time, another aeroplane leaves the same

airport and flies due west at a speed of 1200 km per hour. How far apart will be the two planes after $1\frac{1}{2}$ hours ?

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10. Two poles of heights 6 m and 11 m stand on a plane ground. If the distance between the feet of the poles is 12 m, find the distance between their tops.

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11. D and E are points on the sides CA and CB respectively of a triangle ABC right angled at C. Prove that $AE^2 + BD^2 = AB^2 + DE^2$.

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12. The perpendicular from A on side BC of a ΔABC intersects BC at D such that DB =3CD

(see Fig) Prove that $2AB^2 = 2AC^2 + BC^2$

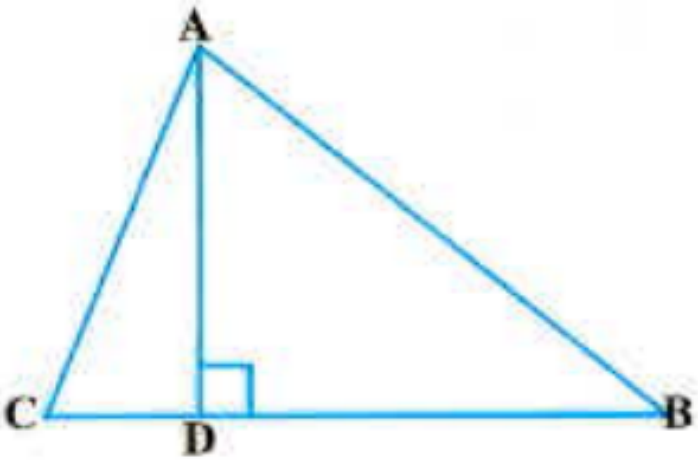

Fig. 6.55

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13. In an equilateral triangle ABC. D is a point on side BC such that BD=1/3 BC. Prove that

$9AD^2 = 7AB^2$.

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14. In an equilateral triangle, prove that three times the square of one side is equal to four times the square of one of its altitudes.

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15. Tick the correct answer and justify: In $\Delta ABC, AB = 6\sqrt{3}cm$, AC=12cm and BC=6cm.

The angle B is ,

A. 120°

B. 60°

C. 90°

D. 45°

Answer: C

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Exercise 6 6 Optional

1. In Fig. 6.56, PS is the bisector of $\angle QPR$ of ΔPQR. Prove that $\frac{QS}{SR} = \frac{PQ}{PR}$

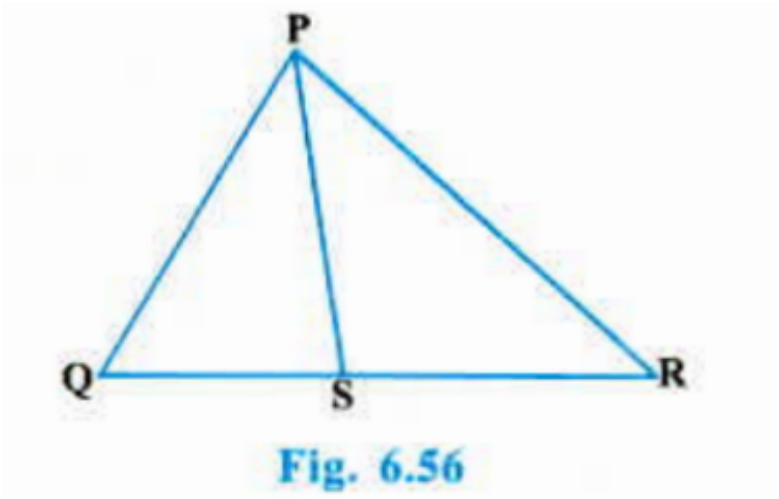

Fig. 6.56

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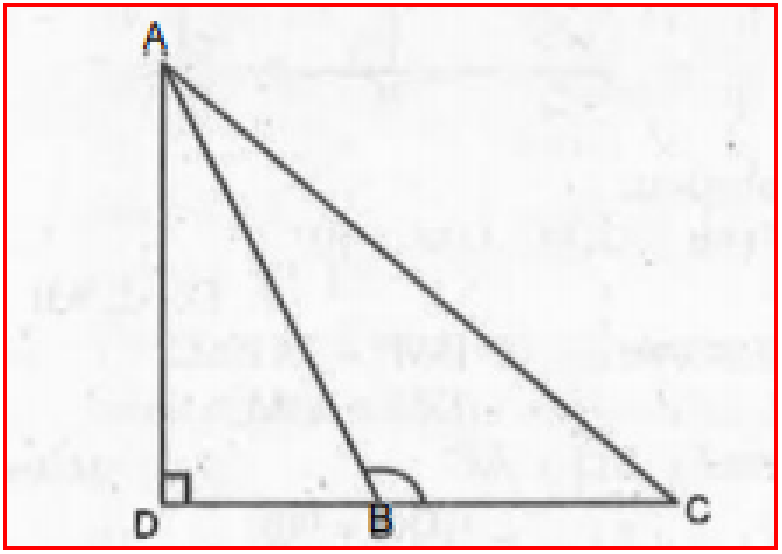
2. In fig., ABC is triangle in which $\angle ABC > 90 \circ 0$ and AD $\perp$ BC produced,

prove that $AC^2 = AB^2 + BC^2 + 2BC.\ BD$.



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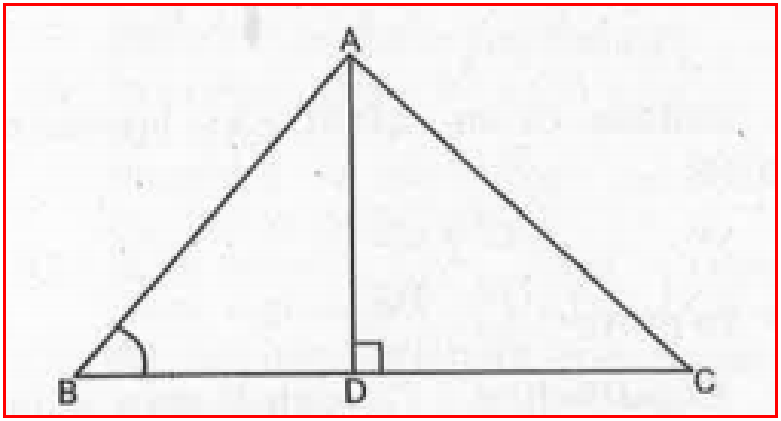
3. In fig., ABC is a triangle in which $\angle ABC < 90 \circ 0,$ and $AD' \perp$ BC produced,

prove that $AC^2 = AB^2 + BC^2 - 2BC.BD$.



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4. Prove that the sum of the squares of the sides of a rhombus is equal to the sum of the squares of its diagonals.

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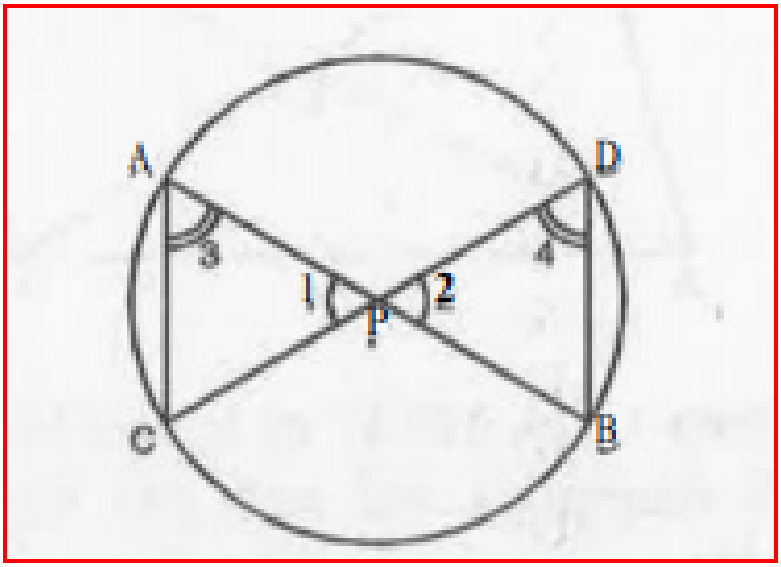
5. In fig., two chords AB and CD intersect each other at the point P prove that :- $\triangle APC \sim \triangle DPB$.



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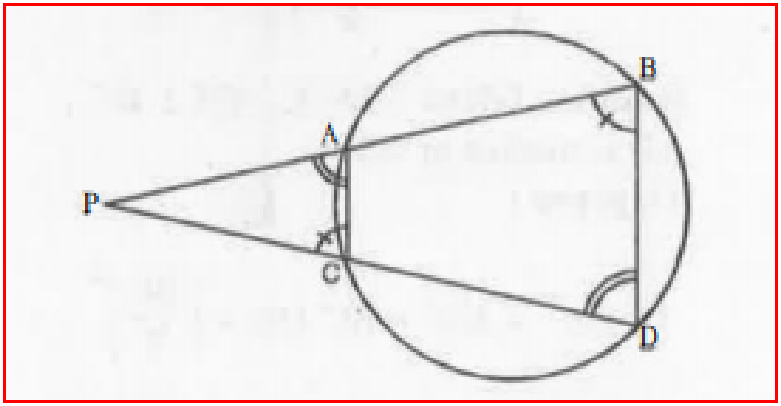
6. In fig., two chords AB and CD of a circle intersect each other at point P (when produced) outside the circle prove :-

$\triangle PCA \sim \triangle PDB$



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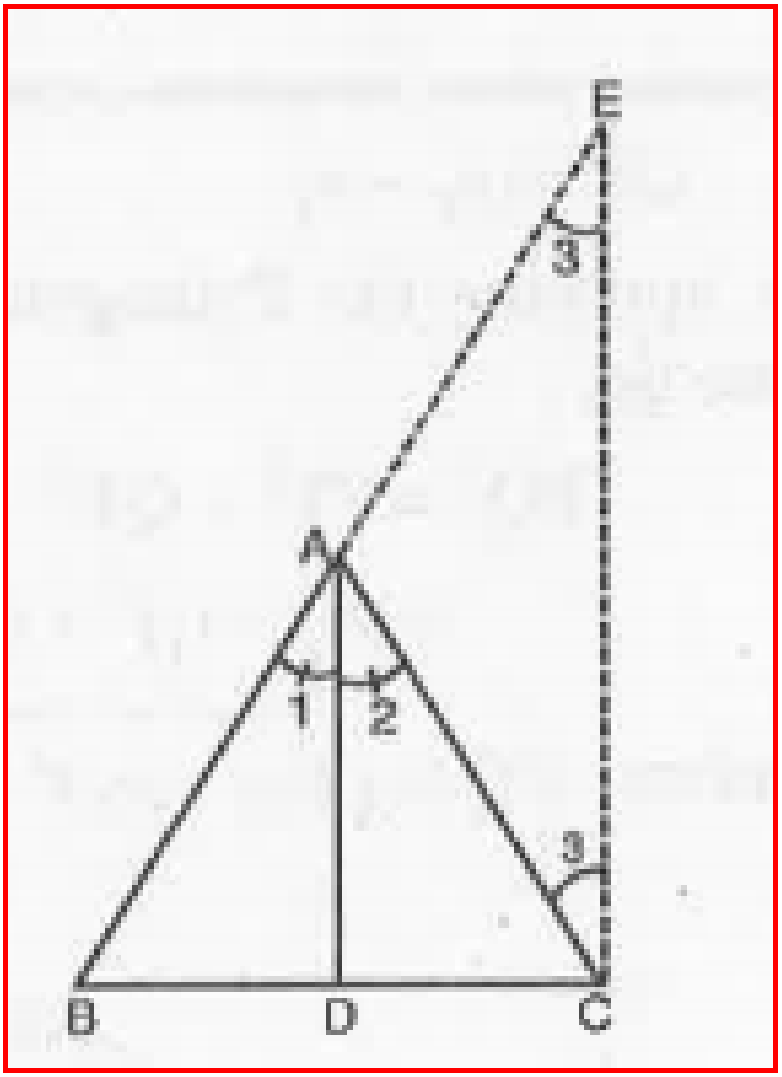
7. In fig., D is a point on side BC of $\triangle ABC$ such that $\frac{BD}{DC} = \frac{AB}{AC}$. Prove that, AD is bisector of $\angle BAC$.



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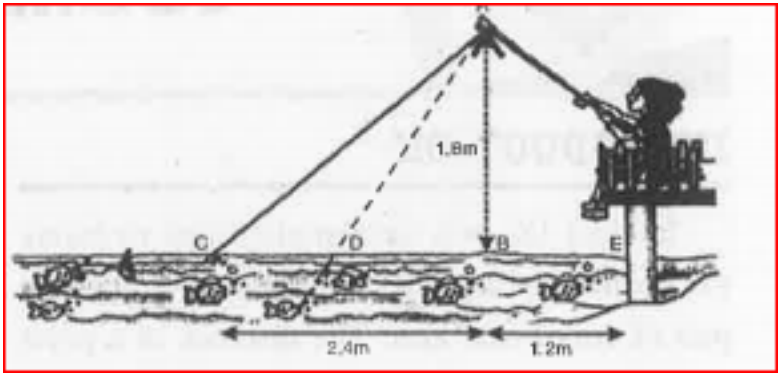
8. Nazima is fly fishing in a stream. The tip of her fishing rod is 1.8 m above the surface of the water and the fly at the end of the string rests on the water 3.6 m away and 2.4 m from a point directly under the tip of the rod. Assuming that her string (from the tip of her rod to the fly) is taut, how much string does she have out ? If she pulls in the string at the rate of 5 cm per second, what will the horizontal distance of the fly from her after 12

seconds ?



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