MATHS

BOOKS - SUPER COMPANION MADE EASY

TRIANGLES

Exercise 2 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 give in brackets :

All squares are ..... (Similar, congruent)

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3. Fill in the blanks

All ..... triangles are similar. (isosceles, equilateral)

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4. Fill in the blanks using the correct word give in brackets :

Two polygons of the same number of sides are similar, if (a) their corresponding angle are ..... and (b) their corresponding side are ..... (equal, proportional) .

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5. Give two different examples of pair of

similar figures.

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6. Give two different examples of pair of

non - similar figures.

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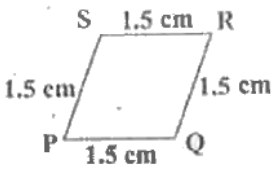
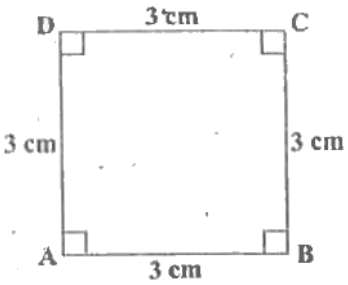
7. State whether the following quadrilaterals are similar or not:





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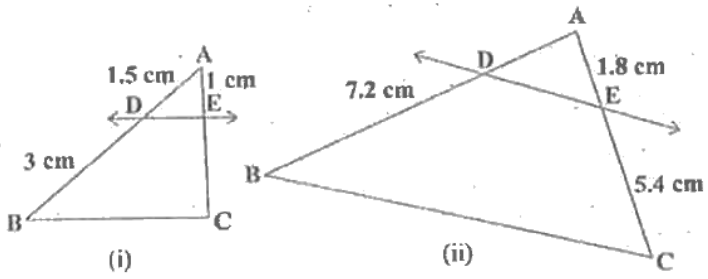
Exercise 2 2

1. In Fig , (i) and (ii) , $DE \mid\mid BC$. Find EC in (i) and AD in (ii).



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2. E and F are point on the sides PQ and PQ and PR respectively of a ΔPQR .For each of the following cases, state whether $\mid\mid QR$:

PE =3.9 cm , EQ = 3cm , PF = 3.6 cm and FR = 2.4 cm

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3. E and F are point on the sides PQ and PQ and PR respectively of a ΔPQR .For each of the following cases, state whether $\mid\mid QR$:

PE = 4 cm , QE = 4.5 cm , PF = 8 cm and RF = 9 cm

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4. E and F are point on the sides PQ and PQ and PR respectively of a ΔPQR .For each of the following cases, state whether $||QR$:

PQ = 1.28 cm, PR = 2.56 cm, PE = 0.18 cm and PF = 0.36 cm

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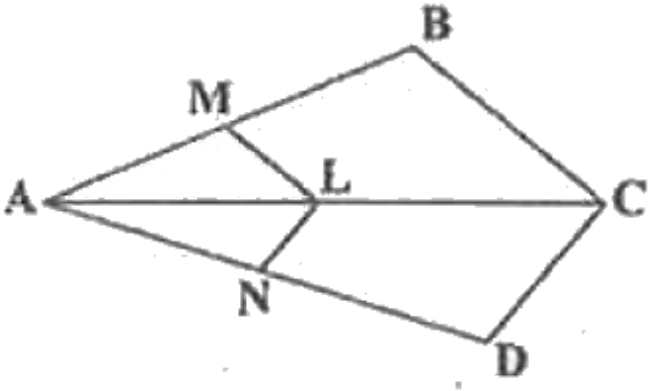
5. In Fig , if $LM||CB$ and $LN||CD$, prove that $\frac{AM}{AB} = \frac{AN}{AD}$



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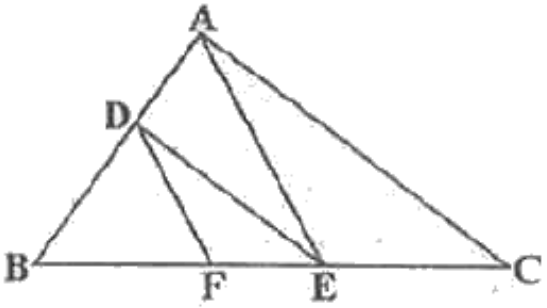
6. In Fig $DE \mid\mid AC$ and AE. Prove that $\frac{BF}{FE} = \frac{BE}{EC}$



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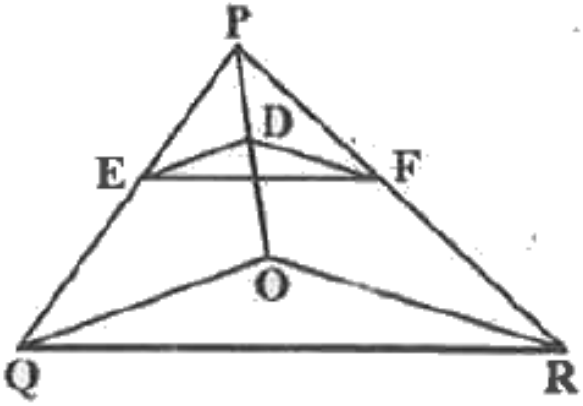
7. In Fig $DE||OQ$ and $DF||OR$. Show that $EF \mid\mid QR$.



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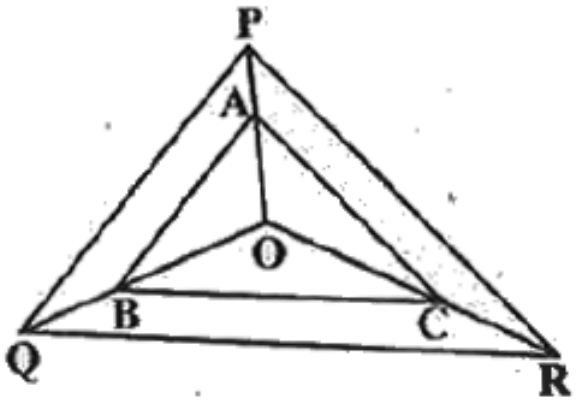
8. In Fig A, B and C are points on OP, OQ and OR respectively such that AB || PQ and AC || PR . Show that BC || QR.



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9. Using Theorem , prove that a line drawn thought 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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10. Using Theorem , prove that the line joining the mid-point of any two sides of a triangle is parallel to the third side. (Recall that you have done it is class IX) .

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

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12. 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 a trapezium.

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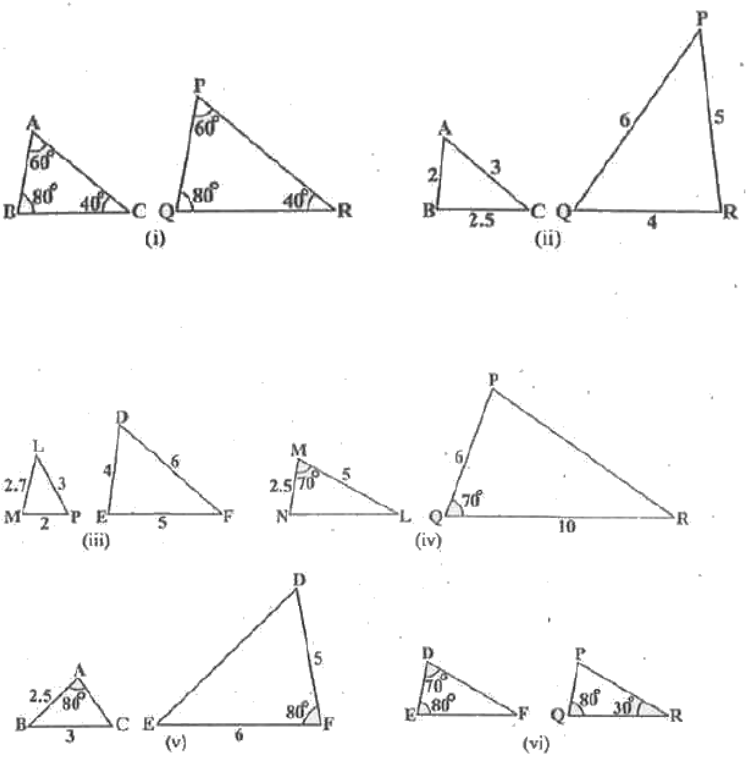
Exercise 2 3

1. State which pairs of triangles in Fig are similar. Write the similarity criterion used by you for answering the question also write the pairs of similar triangles in the symbolic form:



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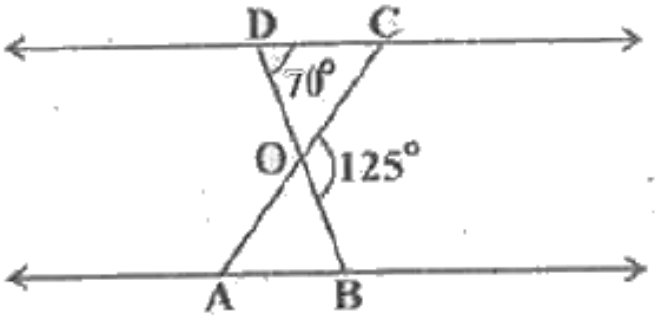
2. In Fig , $\Delta ODC \sim \Delta OBA, \angle BOC = 125^\circ$ and $\angle CDO = 70^\circ$. Find $\angle DOC, \angle D$



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3. 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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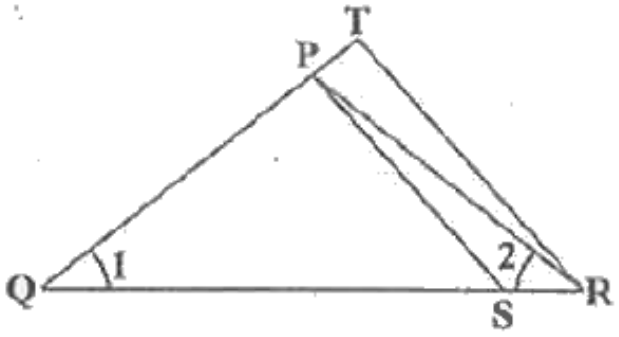
4. In Fig $\frac{QR}{QS} = \frac{QT}{PR} =$ and $\angle 1 = \angle 2$. show that $\Delta PQS \sim \Delta TQR$.



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5. S and T are points on sides PR and QR of ΔPQR such that $\angle P = \angle RTS$. Show that $\Delta RPQ \sim \Delta RTS$.

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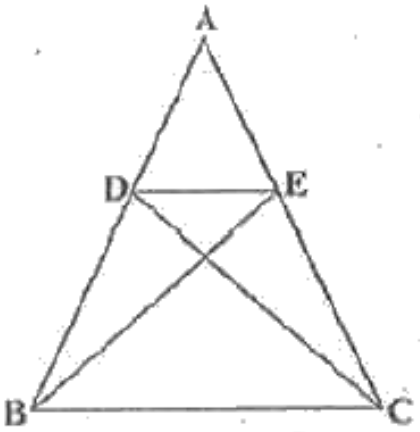
6. In Fig , if $\Delta ABE \angle \Delta ACD$, show that $\Delta ADE \sim \Delta ABC$



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7. In Fig , altitudes AD and CE of triangle ABC intersect each other at the point P. show that : triangleAEP ~triangleCDP`

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8. In Fig , altitudes AD and CE of triangle ABC intersect each other at the point P. show that : $\Delta ABD \sim \Delta CBE$

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9. In Fig , altitudes AD and CE of triangle ABC intersect each other at the point P. show that : $\Delta AEP \sim \Delta ADB$

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10. In Fig , altitudes AD and CE of triangle ABC intersect each other at the point P. show that : $\Delta PDC \sim \Delta BEC$

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

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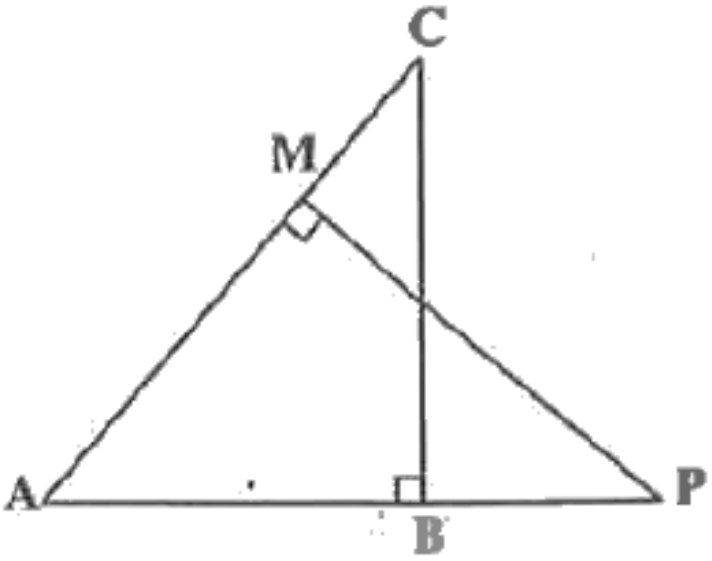
12. In Fig , ABC and AMP are two right triangles, right angled at B and M respectively. Prove that :

$\Delta ABC \sim \Delta AMP$



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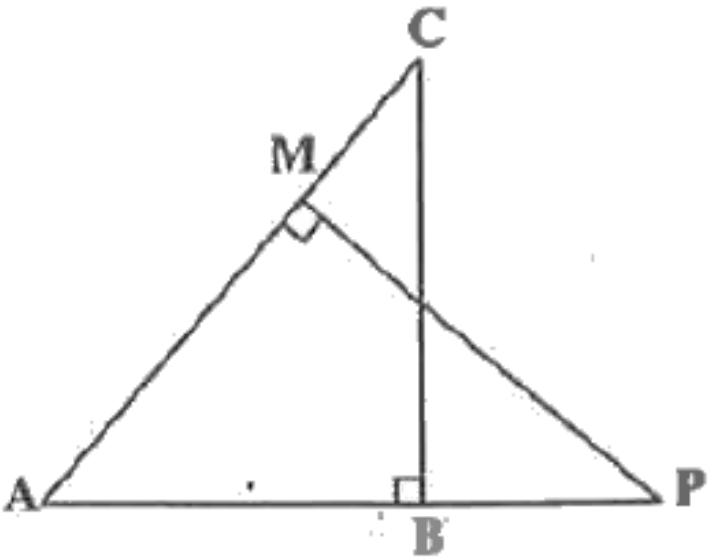
13. In Fig , ABC and AMP are two right triangles, right angled at B and M respectively. Prove that :

$\frac{CA}{PA} = \frac{BC}{MP}$



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14. GD and GH are respectively the bisectors of $\angle ACB$ and $\angle EGF$ such that D and H lie on sides AB and FE of ΔABC and and ΔEFG respectively. If $\Delta ABC \sim \Delta FEG$, show that:

$\frac{CD}{GH} = \frac{AC}{FG}$

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15. GD and GH are respectively the bisectors of $\angle ACB$ and $\angle EGF$ such that D and H lie on sides AB and FE of ΔABC and and ΔEFG respectively. If $\Delta ABC \sim \Delta FEG$, show that:

$\Delta DCB \sim \Delta HGE$

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16. GD and GH are respectively the bisectors of $\angle ACB$ and $\angle EGF$ such that D and H lie on sides AB and FE of ΔABC and and ΔEFG respectively. If $\Delta ABC \sim \Delta FEG$, show that:

$\Delta DCA \sim De < HGF$

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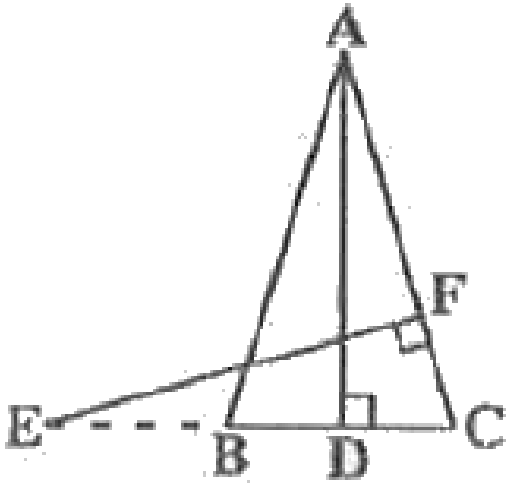
17. In Fig E is a point on side CB produced of an isosceles triangle ABC with AB=AC. If $AD \perp BC$ and $EF \perp AC$, prove that $\Delta ABD \sim \Delta ECT$



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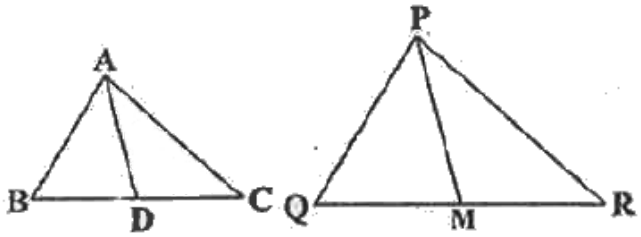
18. sides AB and BC and median AD of a triangle ABC are respectively proportional to side PQ and QR median PM of ΔPQR (see Fig). Show

that $\Delta ABC \sim \Delta PQR$



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

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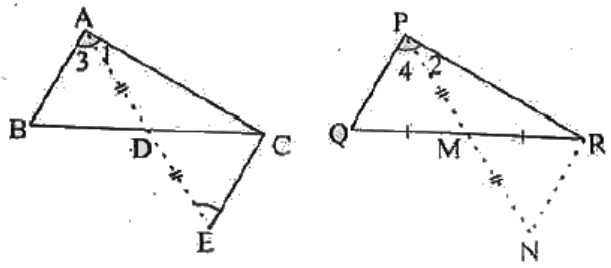
20. side AB and AC and median AD od a triangle ABC are respectively proportional to side PQ and PR and median PM of another triangle PQR.

Show that $\Delta ABC \sim \Delta PQR$



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21. A verticle pole of height 6m casts a shadow 4m long on the ground, and at the same time a tower on the same ground casts a shadow 28m long. Find the height of the tower.

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22. If Adand PM are medians of triangles ABC and PQR, respectively where $\Delta ABC \sim \Delta PQR$, prove that $\frac{AB}{PQ} = \frac{AD}{PM}$

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Exercise 2 4

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

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2. Diagonals of a trapezium ABCd with $AB \mid\mid DC$ 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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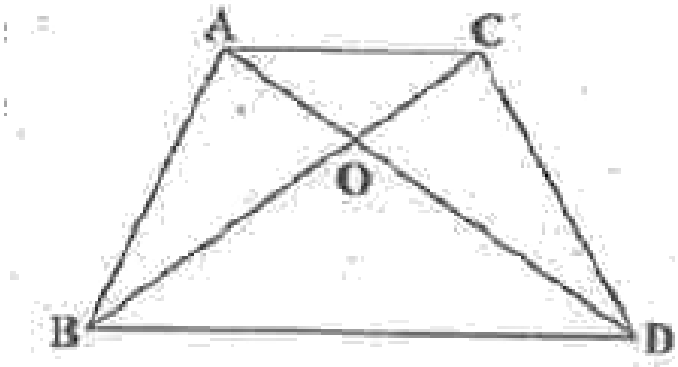
3. In Fig , ABC and DBC are two triangles on the same base BC. If AD intersects BC,at O , show that $\frac{ar(ABC)}{ar(DBC)} = \frac{AO}{DO}$



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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,Eand F are respectively the mid - points of sides AB, BC and CA of ΔABC . Find the ratio of the areas of ΔDEF and ΔABC.

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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 area of an equilateral triangle described on one side of a square is equal of half the area of the equilateral triangle described on one of its diagonals.

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Exercise 2 4 Tick The Correct Answer And Justify

1. ABC and BDF are two equilateral triangles such that D is the mid -point of BC. Ratio of the areas of triangles ABC and BDF is

A. $2:1$

B. $1:2$

C. $4:1$

D. $1:4$

Answer: C

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2. 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 2 5

1. Sides of triangles are given below. Determine which of them are right triangles.

In case of a right triangle , write the length of its hypotenuse.

7cm, 24 cm, 25 cm

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2. Sides of triangles are given below. Determine which of them are right triangles.

In case of a right triangle , write the length of its hypotenuse.

3cm, 24 cm, 25 cm

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3. Sides of triangles are given below. Determine which of them are right triangles.

In case of a right triangle , write the length of its hypotenuse.

50cm, 80cm, 100 cm

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4. Sides of triangles are given below. Determine which of them are right triangles.

In case of a right triangle , write the length of its hypotenuse.

13cm, 12 cm, 5 cm

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5. 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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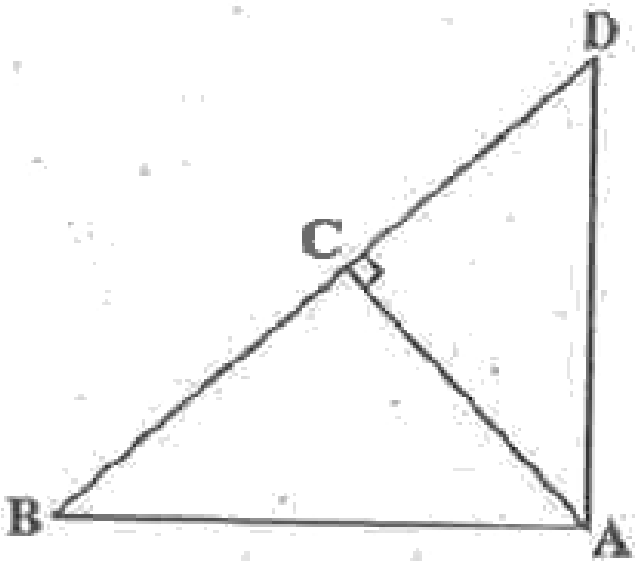
6. In Fig , ABD is a triangle right angled at A and $AC \perp BD$. show that

$AB^2 = BC.BD$



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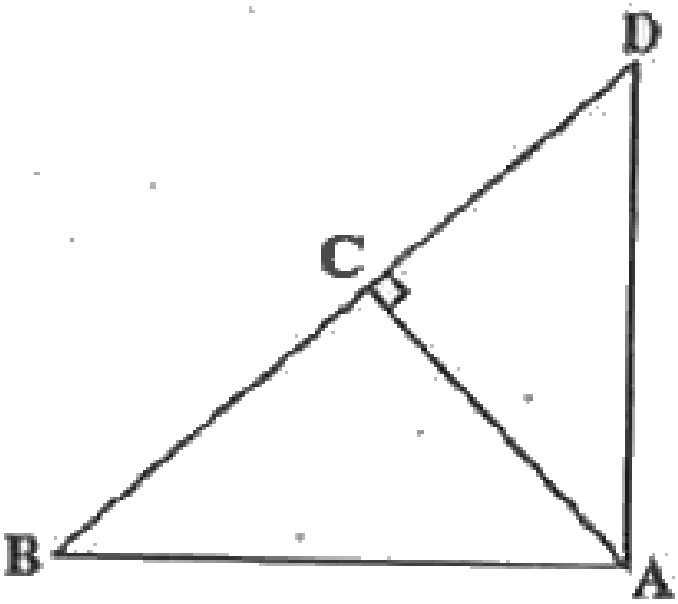
7. In Fig , ABD is a triangle right angled at A and $AC \perp BD$. show that

$AC^2 = BC.DC$



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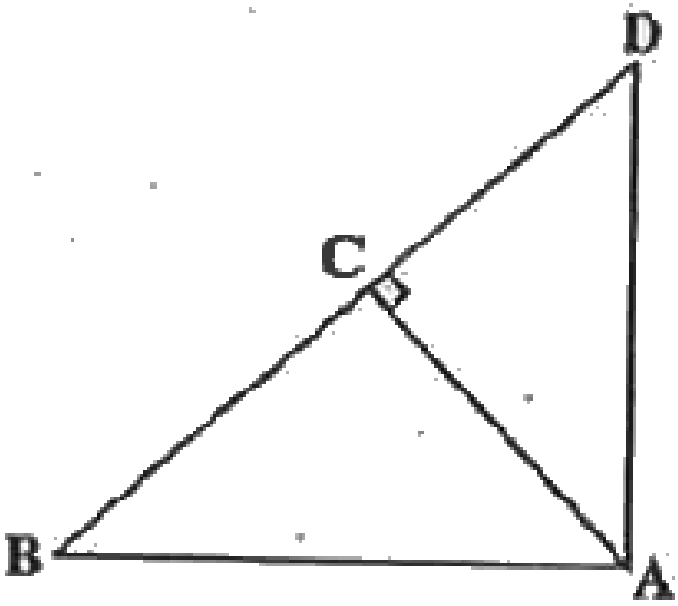
8. In Fig , ABD is a triangle right angled at A and $AC \perp BD$. show that

$AD^2 = BD.CD$



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

.

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

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11. ABC is an equilateral triangle of side 2a. Find each of its altitudes.

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12. Prove that sum of the squares of the side of a rhombus is equal to the to the sum of the squares of its diagonals.

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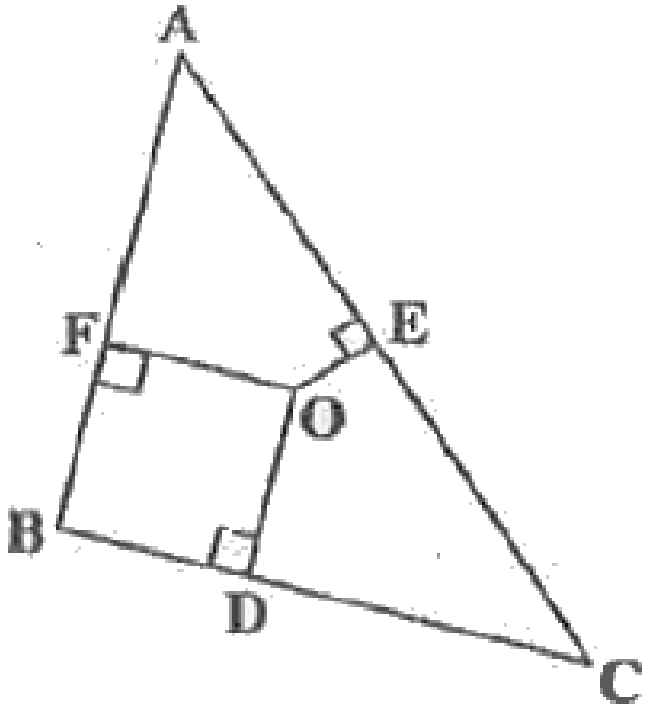
13. In Fig. 2.54, o is a point in the interior of a triangle $ABC, OD \perp BC, OE \perp AC$ and $of \perp AB$. Show that

$$OA^2 + OB^2 + OC^2 - OD^2 - OE^2 - OF^2 = AF^2 + BD^2 + CE^2,$$



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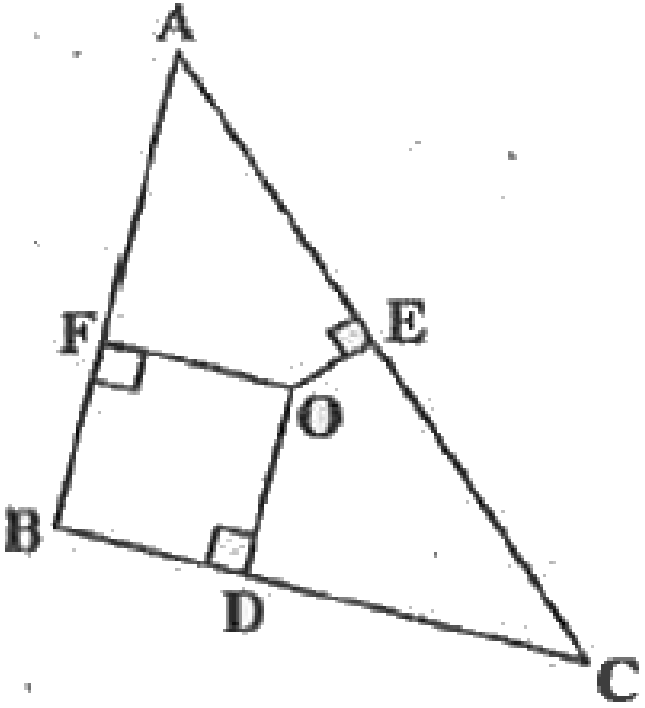
14. In Fig. 2.54, o is a point in the interior of a triangle $ABC, OD \perp BC, OE \perp AC$ and $of \perp AB$. Show that

$AF^2 + BD^2 + CE^2 = AE^2 + CD^2 + BF^2.$



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15. 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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16. 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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17. An aeroplane leaves an airport and files due north at a speed of 1000 km per hour. At the same time, another aeroplane leaves the same airpot 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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18. Two poles of heights 6 m and 11 m stand on a plane ground. If the distance between the feet of the poles is 12m , find the distance between their tops .

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

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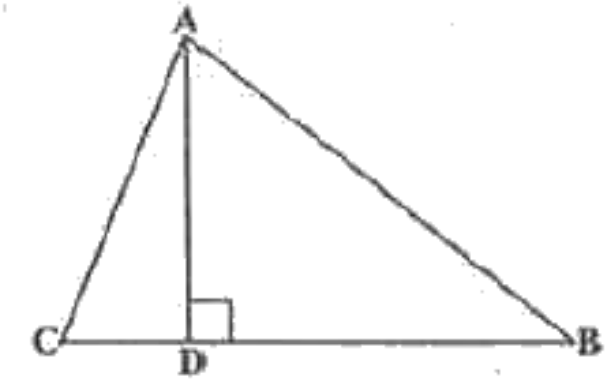
20. The perpendicular from A on side BC of a ΔABC intersects BC at D such the DB = 3 CD . Prove that 2 $AB^2 = 2AC^2 + BC^2$



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21. In an equilateral triangle ABC , D is a point on side BC such that BD = $\frac{1}{3}$ BC . Prove that $9AD^2 = 7AB^2$.

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

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23. 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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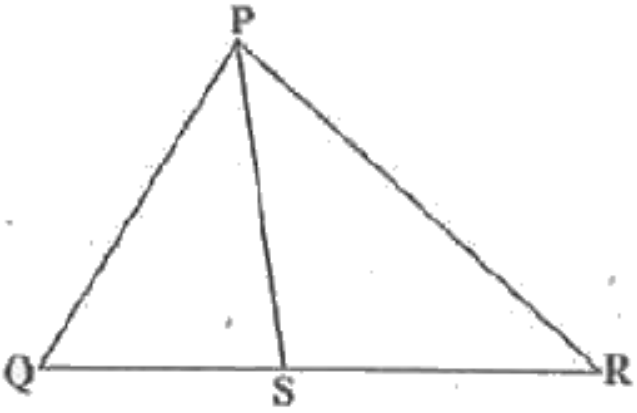
Exercise 2 6 Optional

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



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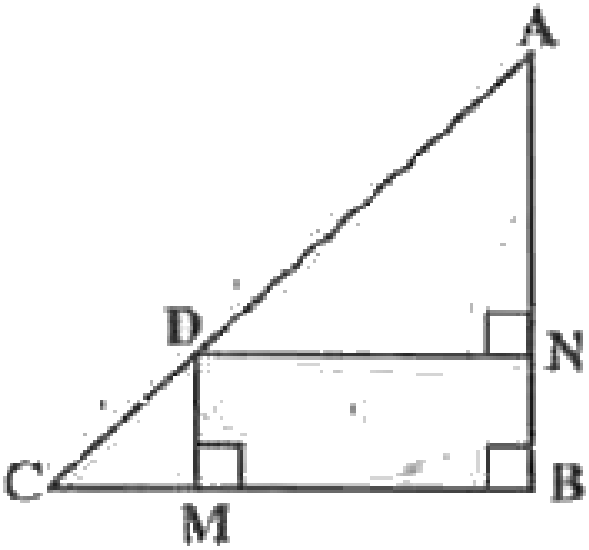
2. In Fig . D is a point on hypotenuse AC of ΔABC, $\perp DM \perp BC$ and $DN \perp AB$. prove that :

$DM^2 = DN.MC$



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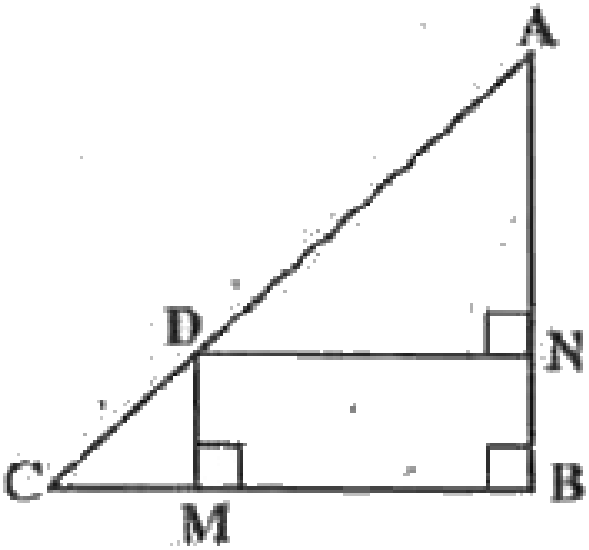
3. In Fig . D is a point on hypotenuse AC of ΔABC, $\perp DM \perp BC$ and $DN \perp AB$. prove that :

$DN^2 = DM.\ AN$



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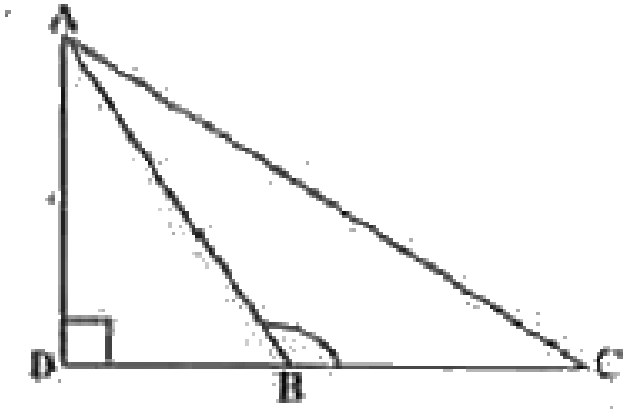
4. In Fig , ABC is a triangle in which $\angle ABC > 90^\circ$ and $AD \perp CB$, produced . Prove that $AC^2 = AB^2 + BC^2 + 2BC.\ BD$



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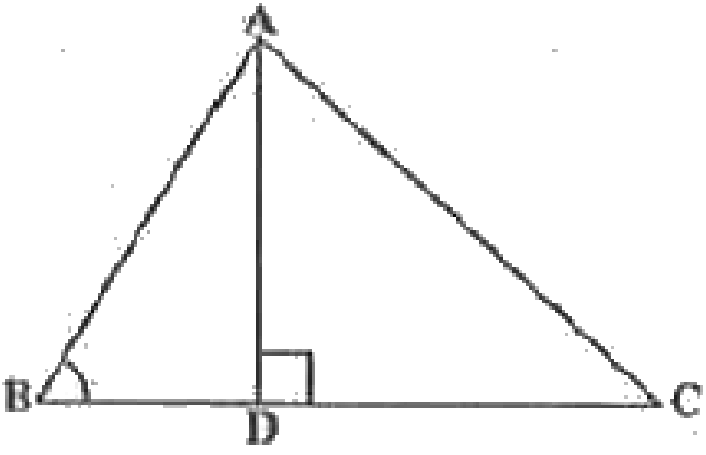
5. In Fig . ABC is a triangle in which $\angle ABC < 90^\circ$ and $AD \perp BC$. Prove that $AC^2 = AB^2 + BC^2 - 2BC.\, BD.$



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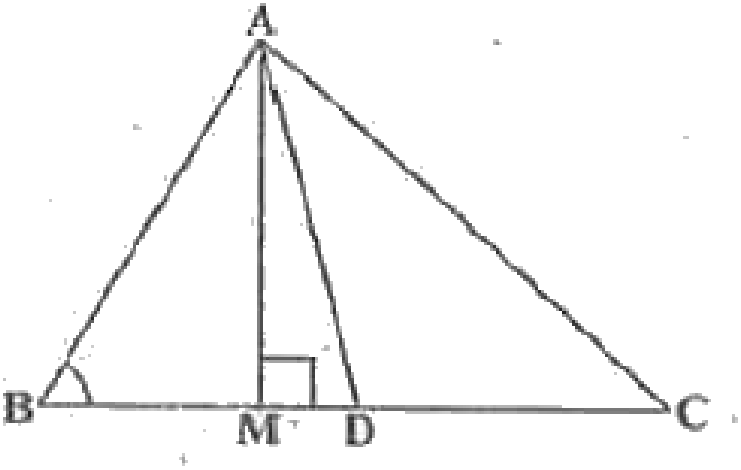
6. In Fig . AD is a median of a triangle ABD and $AM \perp BC$. Prove that :

$AC^2 = AD^2 + BC.$

$DM + \left(\frac{BC}{2}\right)^2$



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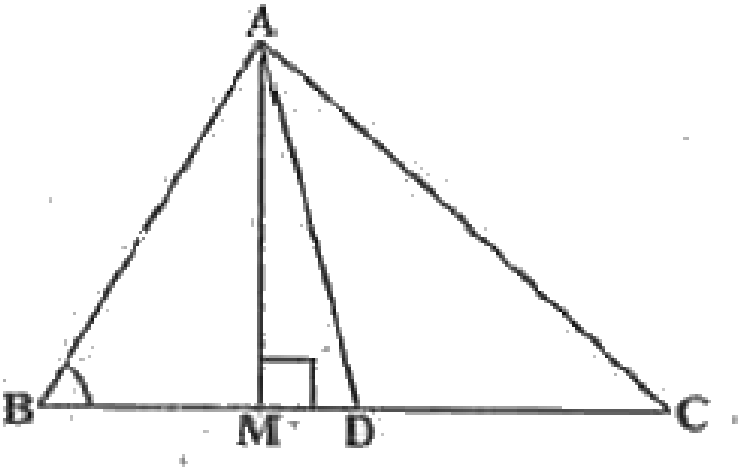
7. In Fig . AD is a median of a triangle ABD and $AM \perp BC$. Prove that :

$$AB^2 = AD^2 - BC.DM + \left(\frac{BC}{2}\right)^2$$



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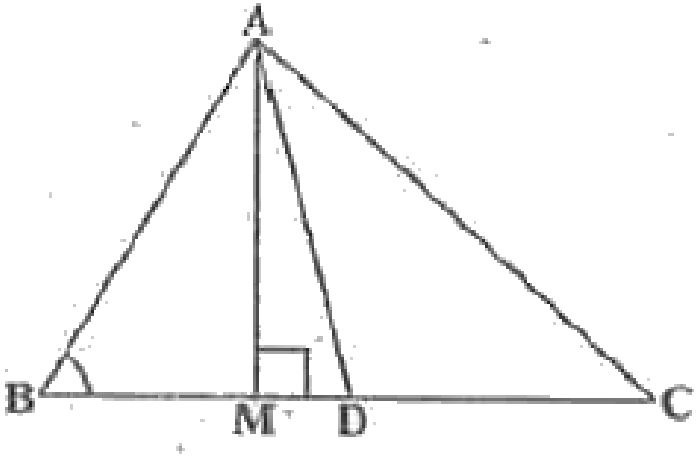
8. In Fig . AD is a median of a triangle ABD and $AM \perp BC$. Prove that :

$AC^2 + AB^2 = 2AD^2 + \frac{1}{2}BC^2$



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9. If the diagonals of a parallelogram are equal, show that it is a rectangle.

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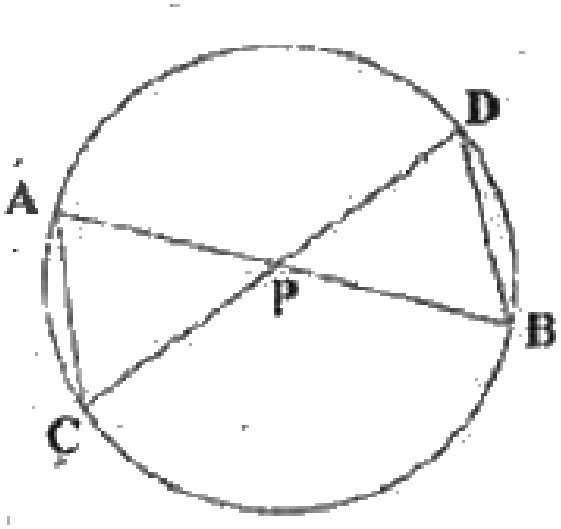
10. In Fig . two chords AB and CD intersect each other at the point P. prove that :

$\Delta APC \sim \Delta DPB$



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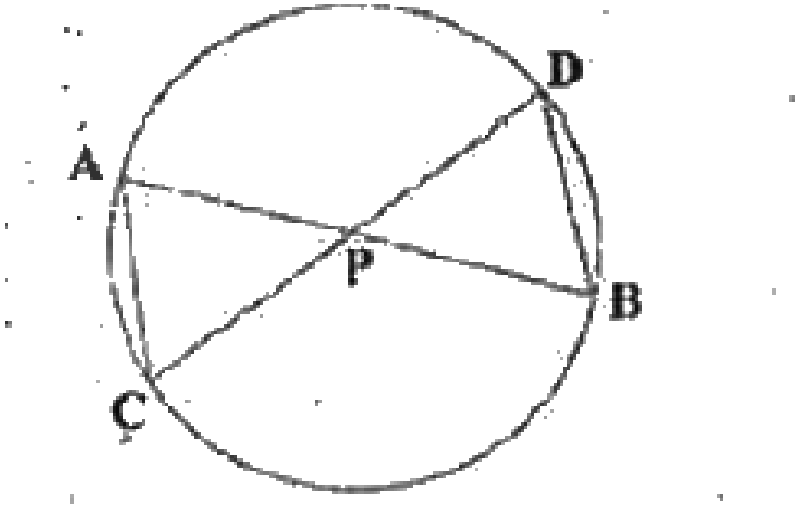
11. In Fig . two chords AB and CD intersect each other at the point P. prove that :

$AP.PB = CP.DP$



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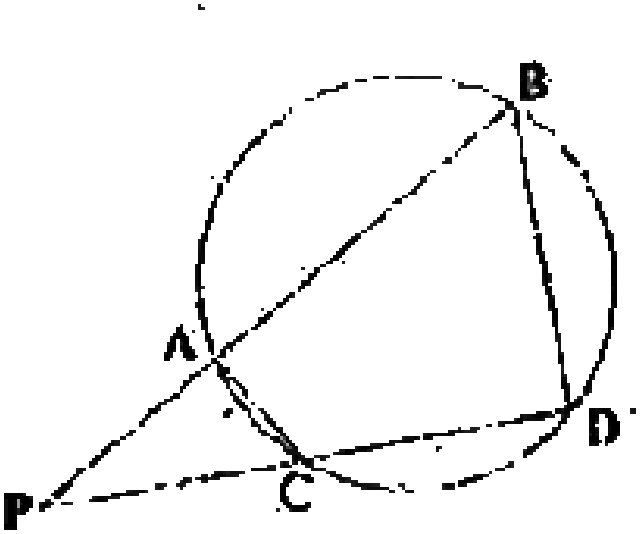
12. In Fig. two chords AB and CD of a circle intersect each other at the point P (when produced) outside the circle prove that

$\Delta PAC \sim \Delta PDB$



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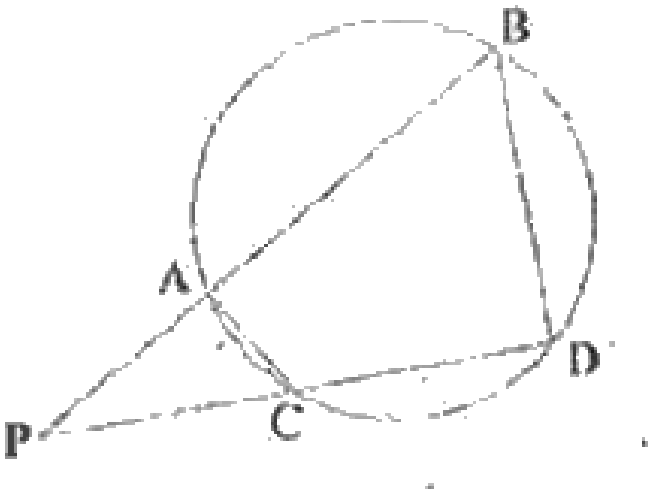
13. In Fig. two chords AB and CD of a circle intersect each other at the point P (when produced) outside the circle prove that

$PA.\ PB = PC.\ PD$



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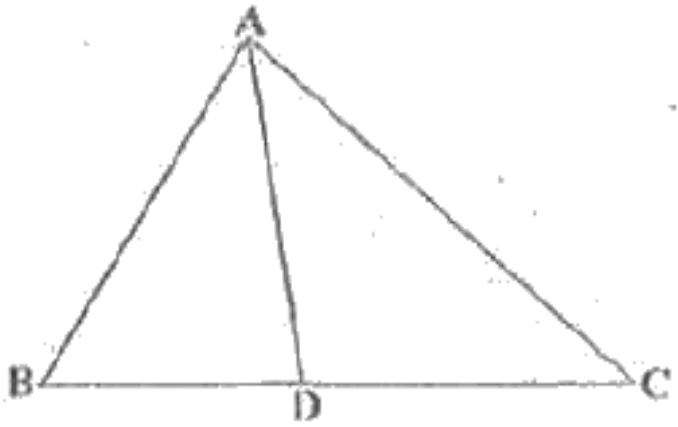
14. In Fig .D is a point on side BC of ΔABC such that $\frac{BD}{CD} = \frac{AB}{AC}$ prove that AD is the bisector of $\angle BAC$.



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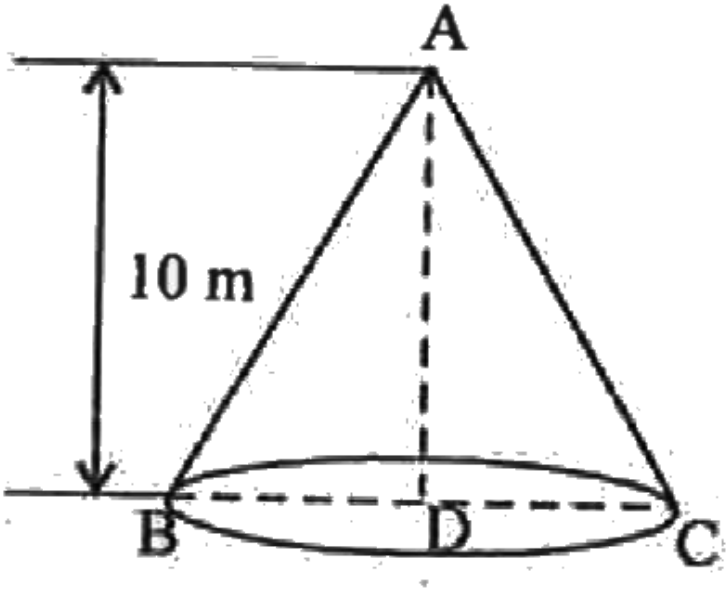
15. A conical tent is 10 m high and the radius of its base is 24 m. Find slant height of the tent.



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