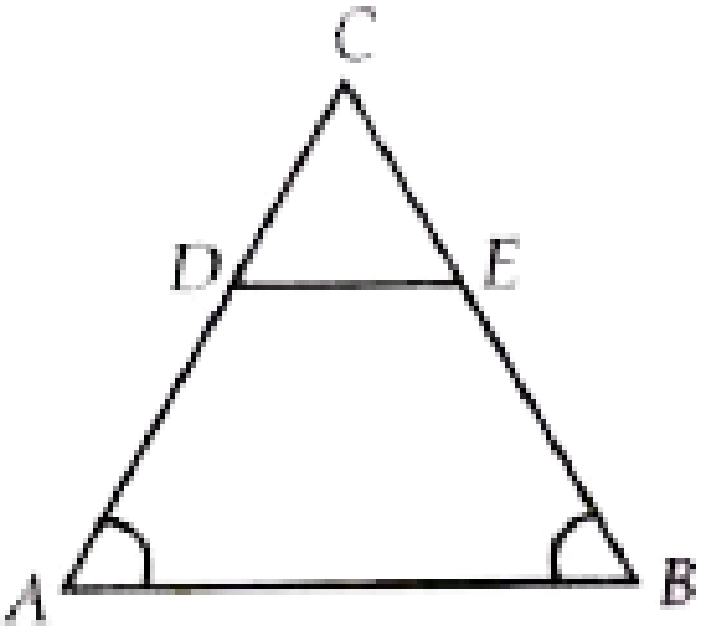
MATHS

BOOKS - MTG IIT JEE FOUNDATION

TRIANGLES

Illustrations

1. In figure ,$\angle A = \angle B$ and $DE \mid\mid AB$ .Prove that AD =BE



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2. ABCD is a trapezium with AB || DC. E and F are points on non-parallel sides AD and BC respectively such that EF is parallel to AB. Show that $\frac{AE}{ED} = \frac{BF}{FC}$.

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3. In a ABC, D and E are points on sides $ABandAC$ respectively such that $BD = CE$. If $\angle B = \angle C$, show that $DEBC$.

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4. ABCD is a parallelogram. P is a point on the side BC DP when produced meets AB produced at L. Prove that $\frac{DP}{PL} = \frac{DC}{BL}$ (ii) $\frac{DL}{DP} = \frac{AL}{DC}$

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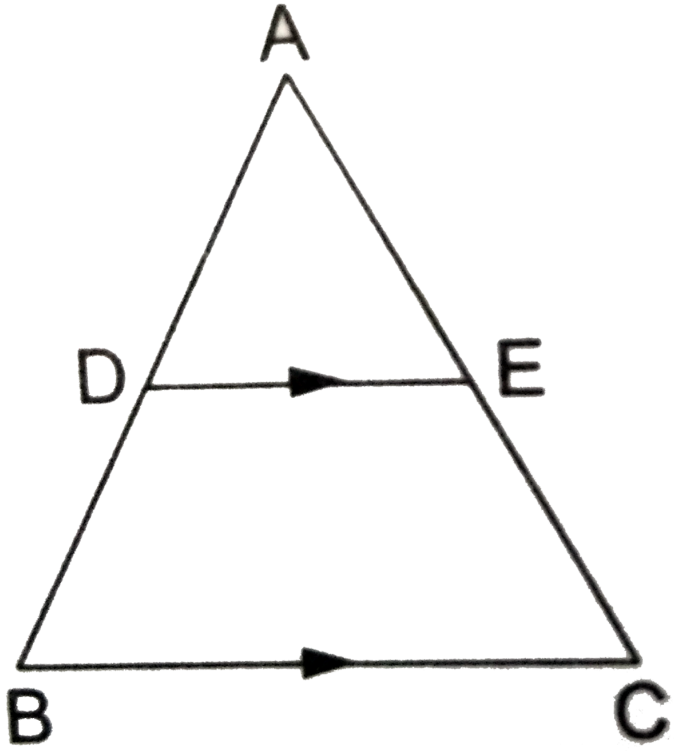
5. In the given figure, $DE||BC$, $AD = 2cm$, $BD = 2.5cm$, $AE = 3.2cm$ and $DE = 4cm$.

Find AC and BC.



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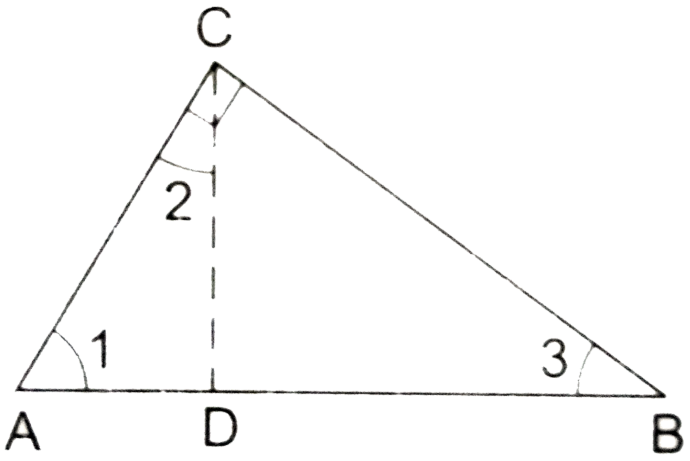
6. In the given figure, $\angle ACB = 90^\circ$ and $CD \perp AB$. Prove that $CD^2 = BD \cdot AD$



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7. Prove that the line segments joining the mid-points of the sides of a triangle from four triangles, each of which is similar to the original triangle.

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8. In Fig. 4.132, if $AD \perp BC$ and $\frac{BD}{DA} = \frac{DA}{DC}$, prove that ABC is a right triangle. (FIGURE)

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

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10. Two isosceles triangles have equal vertical angles and their areas are in the ratio $16:25$. Find the ratio of their corresponding heights.

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11. The areas of two similar triangles are 121 cm^2 and $64cm^2$ respectively. If the median of the first triangle is 12.1 cm, then the corresponding median of the other is :

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12. Prove that the area of an equilateral triangle described on a side of a right-angled isosceles triangle is half the area of the equilateral triangle described on its hypotenuse.

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13. In a triangle $ABC, B = 90^\circ$ and D is the mid-point of BC then prove that $AC^2 = AD^2 + 3CD^2$

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14. BL and CM are medians of a triangle ABC right angled at A. Prove that $4\left(BL^2 + CM^2\right) = 5BC^2$

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Solved Examples

1. One angle of a triangle is equal to one angle of another triangle and the bisectors of these two equal angles divide the opposite sides in the same ratio, prove that the triangles are similar.

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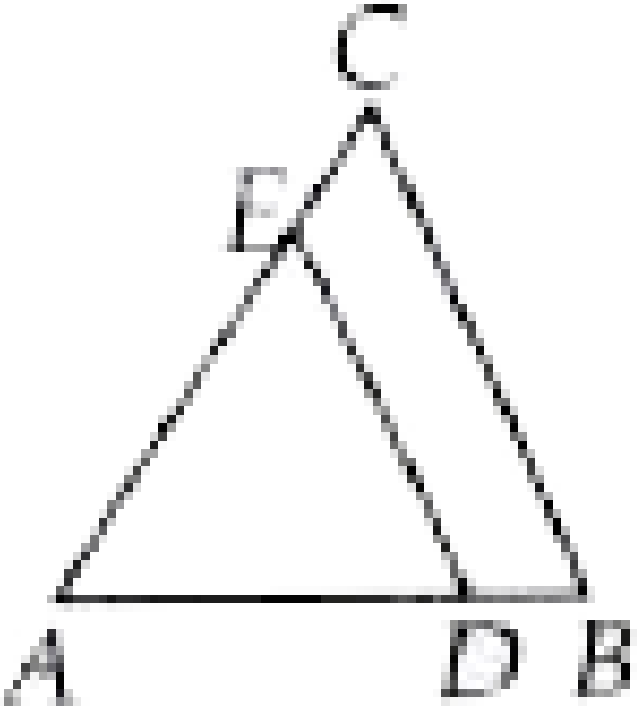
2. In figure , $DE \| BC$.If AD=x+1 , DB = x-2 , AE =x+2andEC =x+3 , find the value of x .



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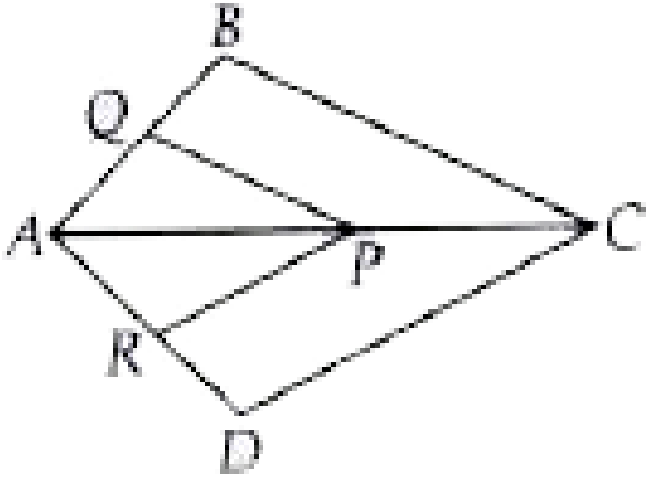
3. In figure , if $PQ||BC$ and $PR||CD$. Prove that $\frac{AR}{AD} = \frac{AQ}{AB}$.



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4. ABC is a triangle in which $AB = AC$ and D is a point on AC such that $BC^2 = AC \times CD$.Prove that $BD = BC$.

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5. In Fig. 4.176, $XYAC$ and XY divides triangular region ABC into two parts equal in area. Determine $\frac{AX}{AB}$.

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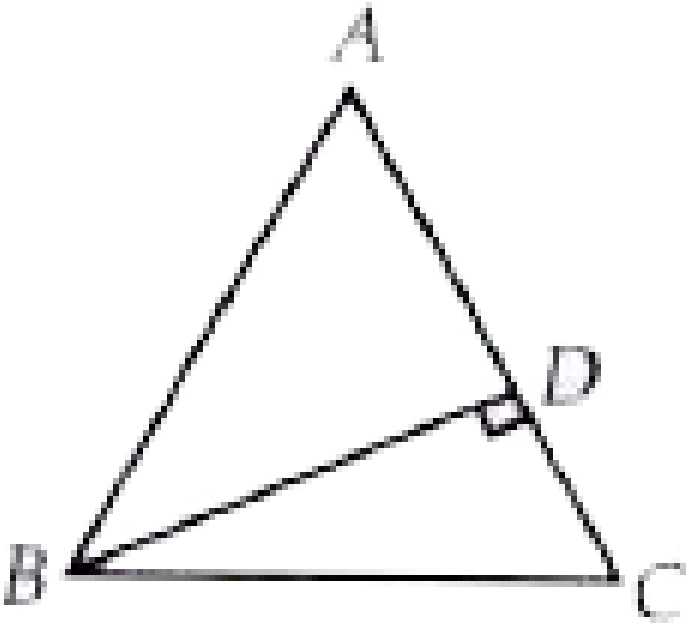
6. In an isosceles $\Delta ABC, AB = AC$ and $BD \perp AC$. Prove that $\left(BD^2 - CD^2\right) = 2CD \cdot AD.$



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7. Equilateral triangles are drawn on the sides of a right triangle. Show that the area of the triangle on the hypotenuse is equal to the sum of the areas of triangles on the other two sides.

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8. P and Q are points on sides AB and AC respectively of ΔABC . If AP = 3 cm , PB = 6 cm , AQ = 5 cm and QC = 10 , show that BC =3PQ .

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9. In Fig. 4.192, ABC is a right triangle right-angled at B . AD and CE are the two medians drawn from A and C respectively. If $AC = 5cm$ and $AD = \frac{3\sqrt{5}}{2}cm$, find the length of CE . (FIGURE)

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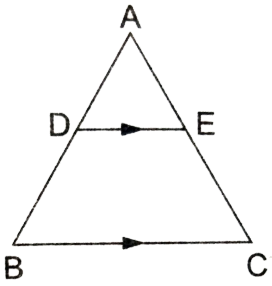
10. In $\Delta ABC, DE \| BC$ such that $\frac{AD}{DB} = \frac{3}{5}$. If $AC = 5.6cm$ then, AE=?



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11. $ABCD$ is a quadrilateral; $P, Q, RandS$ are the points of trisection of side $AB, BC, CDandDA$ respectively and are adjacent to $AandC$; prove that $PQRS$ is parallelogram.

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12. If three or more parallel lines are intersected by two transversal; Prove that the intercepts made by them on tranversal are propotional.

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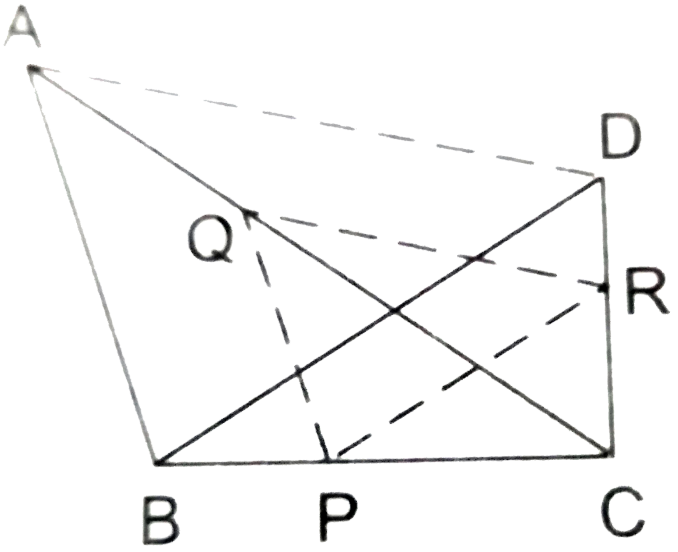
13. ΔABC and ΔDBC lie on the same side of BC, show in the figure. From a point on BC. $PQ||AB$ and $PR||BD$ are drawn, meeting AC at Q, and CD at R respectively. Prove that $QA \mid\mid AD$.



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

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15. O is any point inside a rectangle ABCD. Prove that $OB^2 + OD^2 = OA^2 + OC^2$.

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16. In right-angled triangle ABC in which $\angle C = 90o$, if D is the mid-point of BC , prove that $AB^2 = 4\,AD^2 - 3\,AC^2$.

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Ncert Section Exercise 6 1

1. Fill in the blanks using the correct word given in brackets: All circles are ..... (congruent, similar) All squares are ..... (similar, congruent) (iii) All ..... triangles are similar (isosceles, equilaterals):

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2. Fill in the blanks using the correct word given in bracket: (i) All circles are_____(congruent, similar) (ii) All squares are____. (similar, congruent) (iii) All_____triangles are similar, (isosceles, equilateral) (iv) Two polygons of the

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3. Fill in the blanks using the correct word given in brackets: All circles are ..... (congruent, similar) All squares are ..... (similar, congruent) (iii) All ..... triangles are similar (isosceles, equilaterals):

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

similar, if (a) their corresponding angles are and (b) their corresponding sides 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. Give two different examples of pair of (i) similar figures. (ii) non-similar figures.

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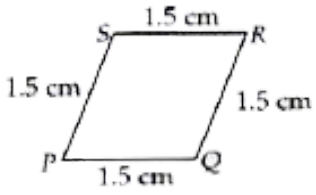
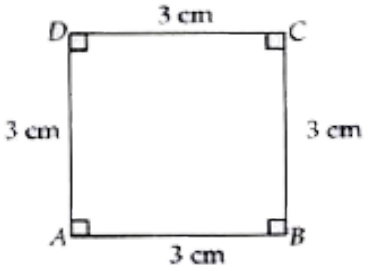
7. State whether the following quadrilaterals non similar or not :





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Ncert Section Exercise 6 2

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

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2. E and F are points on the sides PQ and PR respectively of ΔPQR. For each of the following cases, state whether EF || QR: (i) PE = 3.9 cm. EQ = 3 cm. PF = 3.6 cm and FR = 2.4 (ii) PE = 4 cm. QE = 4.5 cm. PF = S cm and RF = 9 cm(iii)

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3. E and F are points on the sides PQ and PR respectively of ΔPQR. For each of the following cases, state whether EF || QR: (i) PE = 3.9 cm. EQ = 3 cm. PF = 3.6 cm and FR = 2.4(ii) PE = 4 cm. QE = 4.5 cm. PF = S cm and RF = 9 cm(iii)

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4. E and F are points on the sides PQ and PR respectively of ΔPQR. For each of the following cases, state whether EF || QR: (i) PE = 3.9 cm. EQ = 3 cm. PF = 3.6 cm and FR = 2.4(ii) PE = 4 cm. QE = 4.5 cm. PF = S cm and RF = 9 cm(iii)

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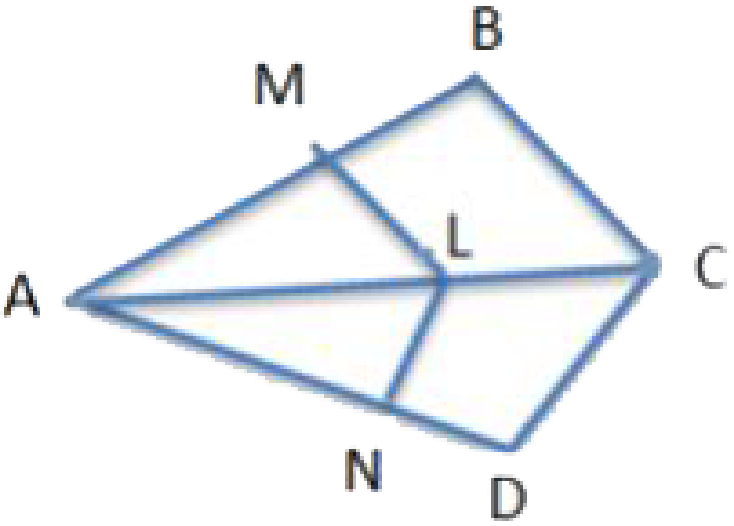

5.

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

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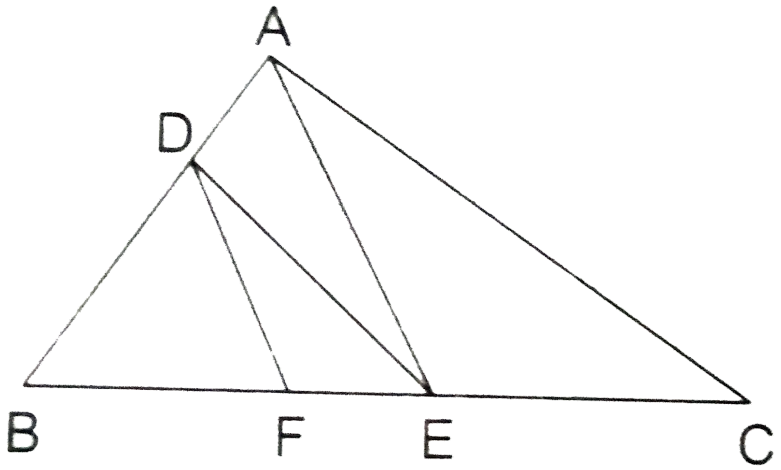
6. In the given figure, $DE||AC$ and $DF||AE$.

Prove that $\frac{BF}{FE} = \frac{BE}{EC}$



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7. In figure DE || OQ and DF || OR. Show that EF||QR.

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8. In figure 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. Theorem 8.10 : The line drawn through the mid-point of one side of a triangle, parallel to another side bisects the third side.

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10. Prove that the line joining the middle points of the two sides of a triangle is parallel to the third side.

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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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Ncert Section Exercise 6 3

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

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

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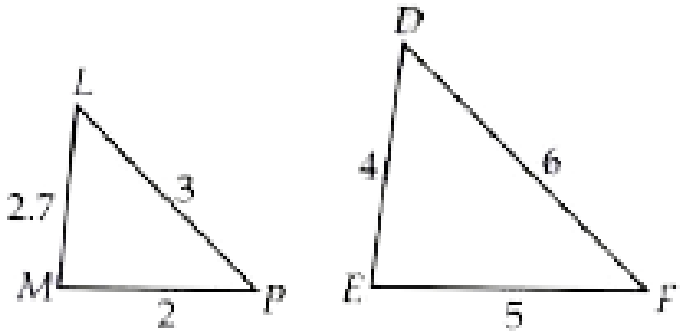
3. State which pairs of triangles in the given figures are similar .Write the similarity criterion used by you for answering the question and also write

the pairs of similar triangles in the symbolic form :



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

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

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

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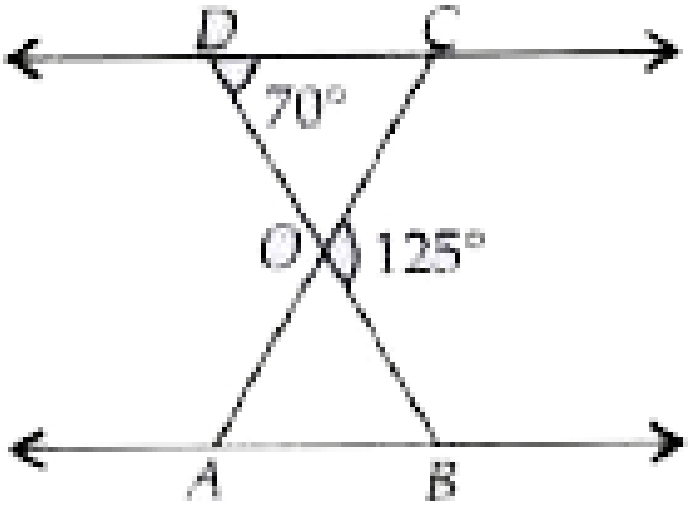
7. In the figure , $\Delta ODC \sim \Delta OBA, \angle BOC = 125^\circ$ and $\angle CDO = 70^\circ$. Find $\angle DOC, \angle DCO$ and $\angle OAB$.



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8. 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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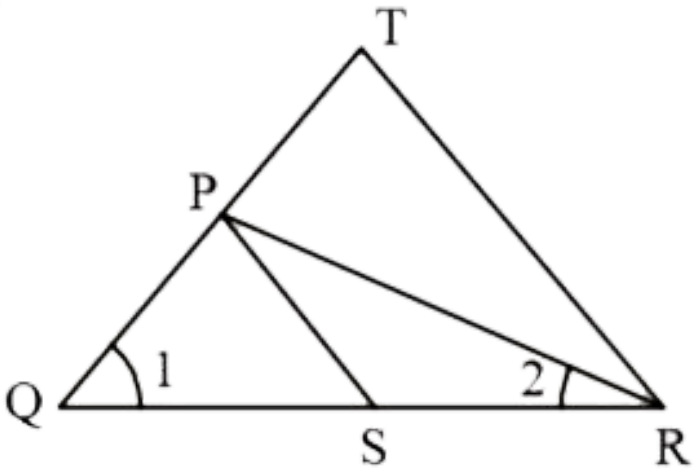
9. In the given figure, $\frac{QR}{QS} = \frac{QT}{PR}$ and $\angle 1 = \angle 2$ then prove that $\triangle PQS \sim \triangle TQR$.



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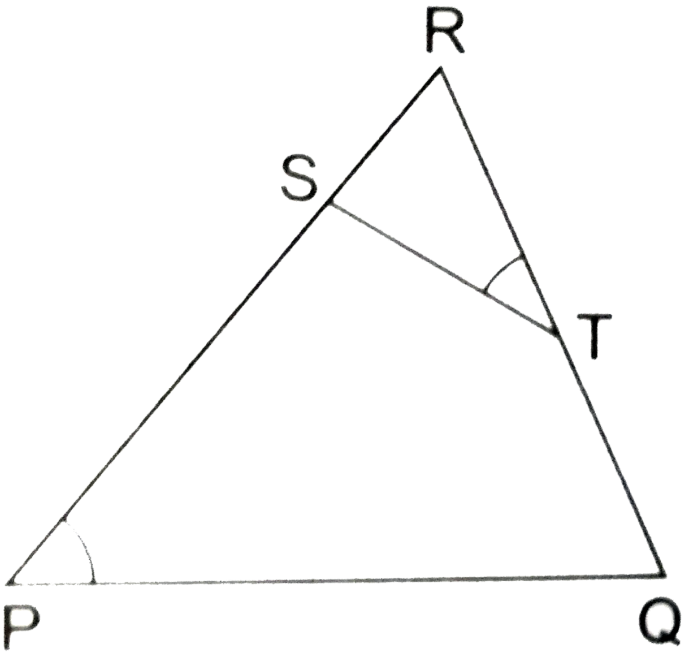
10. In the given figure, S and T are points on sides PR and QR of ΔPQR such that $\angle P = \angle RTS$. Show that $\Delta RPQ \sim \Delta RTS$.



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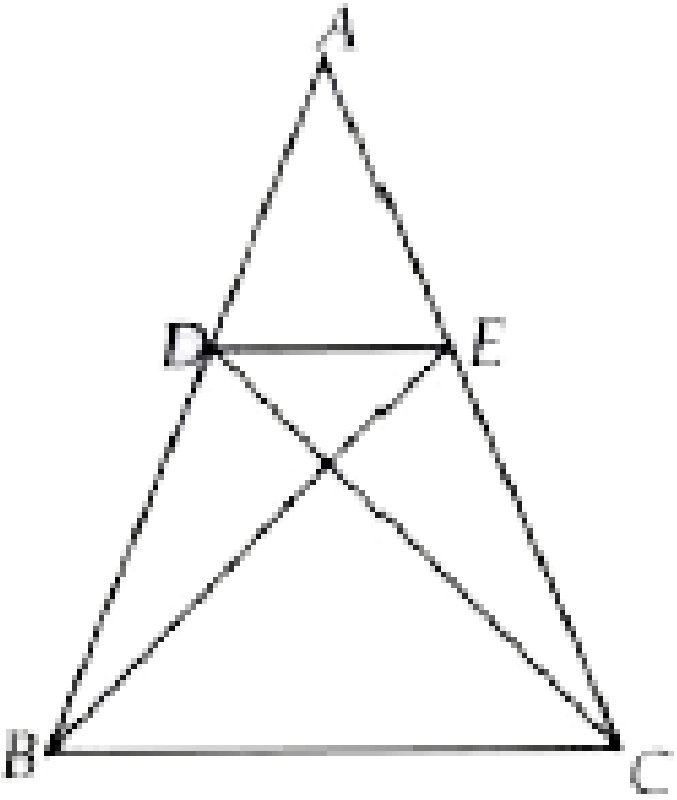
11. In the figure ,if $\Delta ABE \cong \Delta ACD$, Show that $\Delta ADE \sim \Delta ABC$.



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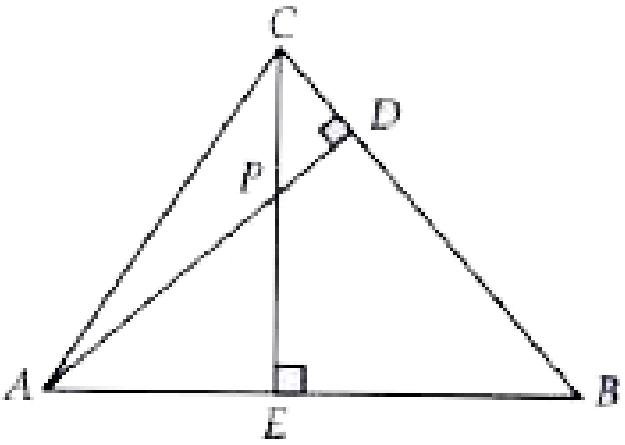
12. In the figure , altitudes AD and CE of ΔABC intersect each other at the point P . Show that :



$\Delta AEP \sim \Delta CDP$

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13. In Figure altitudes AD and CE of DABC intersect each other at the point P. Show that: (i) $\Delta AEP \Delta CDP$ (ii) $\Delta ABD \Delta CBE$ (iii) $\Delta AEP \Delta ADB$ (iv) $\Delta PDC \Delta BEC$

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14. In Figure altitudes AD and CE of DABC intersect each other at the point P. Show that: (i) $\Delta AEP \Delta CDP$ (ii) $\Delta ABD \Delta CBE$ (iii) $\Delta AEP \Delta ADB$ (iv) $\Delta PDC \Delta BEC$

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15. In Figure altitudes AD and CE of DABC intersect each other at the point P. Show that: (i) $\Delta AEP \Delta CDP$ (ii) $\Delta ABD \Delta CBE$ (iii) $\Delta AEP \Delta ADB$ (iv) $\Delta PDC \Delta BEC$

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16. 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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17. In figure ABC and AMP are two right triangles, right angles at B and M respectively. Prove that (i) $\Delta ABC \Delta AMP$ (ii) $\frac{CA}{PA} = \frac{BC}{MP}$

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18. 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 ΔABC and ΔEFG respectively. If $\Delta ABC \Delta FEG$, show that:(i) $\frac{CD}{GH} = \frac{AG}{FG}$ (ii) `DeltaD

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19. In figure 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 $\Delta ABD \Delta ECF$.

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20. Sides AB and BC and median AD of a triangle ABC are respectively propor-/ tional to sides PQ and QR and median PM of ΔPQR (see Fig. 6.41). Show that $\Delta ABC \sim \Delta POR$.

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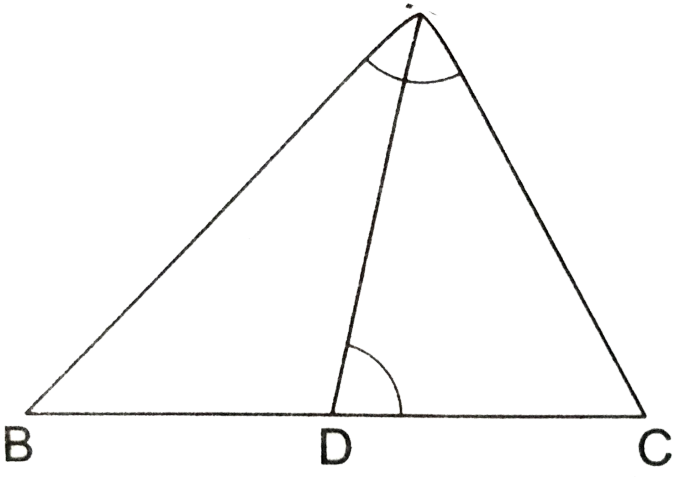
21. In the given figure , D is a point on the side BC of ΔABC such that $\angle ADC = \angle BAC$. Prove that $CA^2 = CB \times CD$.



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22. Sides AB and AC and median AD of a triangle ABC are respectively proportional to sides PQ and PR and median PM of another triangle PQR. Show that $\Delta ABC \Delta PQR$.

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

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Ncert Section Exercise 6 4

1. Let $\Delta ABC - \Delta DEF$ 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 || 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. 6.44, 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, E and F are respectively the mid-points of sides AB. BC and CA of ΔABC. Find the ratio of the areas of DDEF and ΔABC.

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6. Theorem 6.6 : The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides.

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

one of its diagonals.

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8. ABC and BDE are two equilateral triangles such that D is the mid-point of BC . The ratio of the areas of the triangles ABC and BDE is $2:1$ (b) $1:2$ (c) $4:1$ (d) $1:4$

A. $2:1$

B. $1:2$

C. $4:1$

D. $1:4$

Answer: C

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9. Sides of two similar triangles are in the ratio $4:9$. Areas of these triangles are in the ratio. $2:3$ (b) $4:9$ (c) $81:16$ (d) $16:81$

A. $2:3$

B. $4:9$

C. $81:16$

D. $16:81$

Answer: D

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Ncert Section Exercise 6 5

1. Sides of triangle are given below. Determine which of them are right triangles. In case of a right triangle, write the length of its hypotenuse.

(i) 7 cm, 24 cm, 25 cm (ii) 3 cm, 8 cm, 6 cm

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2. Sides of triangle are given below. Determine which of them are right triangles. In case of a right triangle, write the length of its hypotenuse.

(i) 7 cm, 24 cm, 25 cm (ii) 3 cm, 8 cm, 6 cm

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3. Sides of triangles are given below. Determine which of them right triangles are. In case of a right triangle, write the length of its hypotenuse. (i) 7 cm 24 cm 25 cm (ii) 3 cm. 8 cm 6 cm (iii) 50 cm, 80 cm 100 cm (iv) 13 cm 12 cm 5 cm

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4. Sides of triangle are given below .Determine which of them are right triangles .In case of a right triangle , write the length of its hypotenuse .

13 cm , 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 $PM^2 = QM\dot{M}R$.

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6. In Figure 2, Delta ABD is a right triangle, right-angled at A and AC _|_ BD. Prove that AB* = BC . BD.

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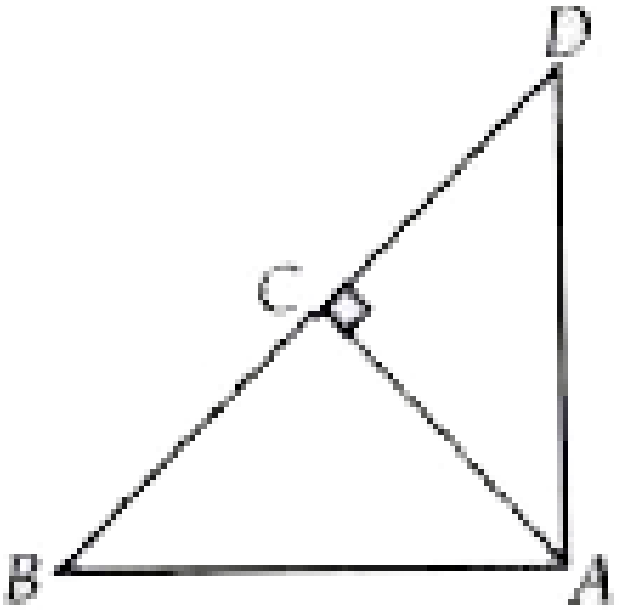
7. In the figure , ABD is a triangle right angled at A and AC $\perp$ Bd . Show that



$AD^2 = BD \cdot CD$

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

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

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

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11. 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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12. In figure, O is a point in the interior of a triangle ABC, $OD \perp BC, OE \perp AC$and $OF \perp AB$. Show that (i) $OA^2 + OB^2 + OC^2 - OD^2 - OE^2 - OF^2 = AF^2 + BD^2 + CE^2$(ii) $AF^2 + BD^2 + CE^2 = AW^2 + CD^2 + BF^2$

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13. A ladder 10m 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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14. A guy wire attached to a vertical pole of height 18m 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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15. An aeroplane leaves an airport and flies due north at a speed of 1000 km per hour. At the same tune, 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`1/2

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16. Two poles of heights 6 m and 11m 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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17. 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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18. The perpendicular from A on side BC of a ABC intersects BC at D such that DB = 3 CD. Prove that $2AB^2 = 2AC^2 + BC^2$.

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19. 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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20. 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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21. Tick the correct answer and justify: In ΔABC AB = $6\sqrt{3}$cm. AC = 12 cm and BC = 6 cm. The angle B is:(A) 120 (B) 60 (C) 90 (D) 45

A. 120°

B. 60°

C. 90°

D. 45°

Answer: C

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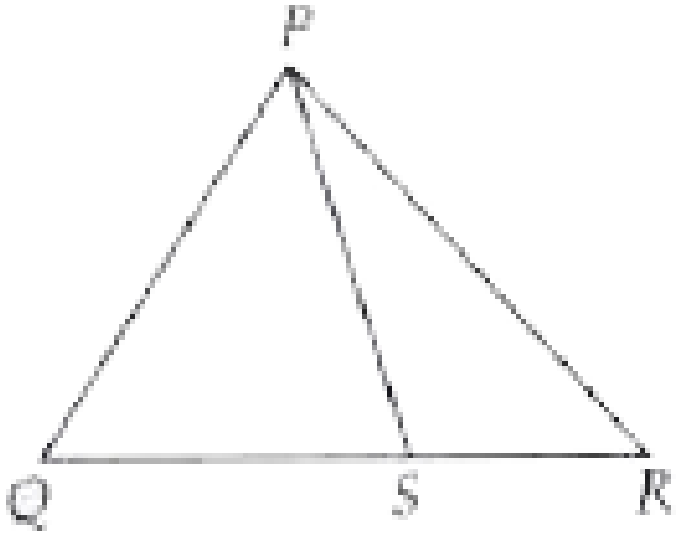
Ncert Section Exercise 6 6

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



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2. In Fig. 4.121, ABC is a right triangle right angled at B and D is the foot of the the perpendicular drawn from B on AC . If $DM \perp BC$ and $DN \perp AB$, prove that: (FIGURE) $DM^2 = DN \times MC$ (ii) $DN^2 = DM \times AN$

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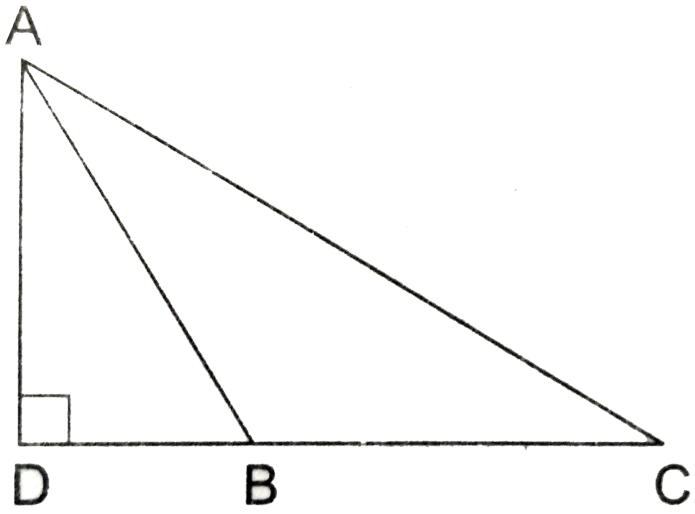
3. In the given figure, ΔABC is an obtuse triangle, obtuse-angled at B. If $AD \perp CB$ (produced) prot that $AC^2 = AB^2 + BC^2 + 2BC \cdot BD$



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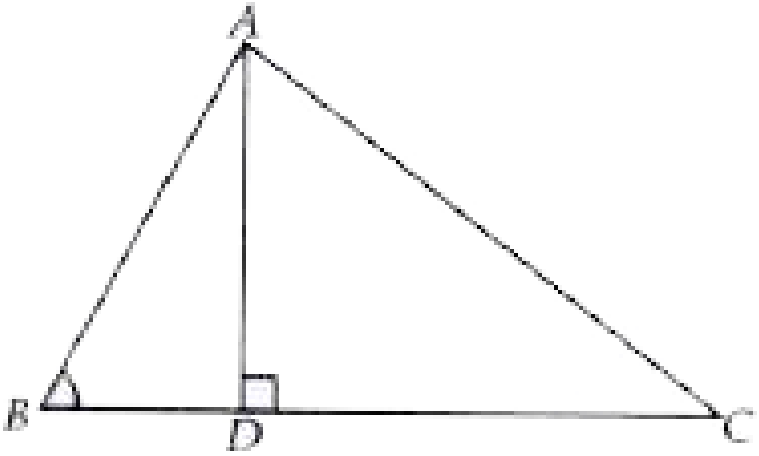
4. In the figure , ABC is triangle in which $\angle ABC < 90^\circ$ and $AD \perp BC$.

Prove that $AC^2 = AB^2 + BC^2 - 2BC \cdot BD$.



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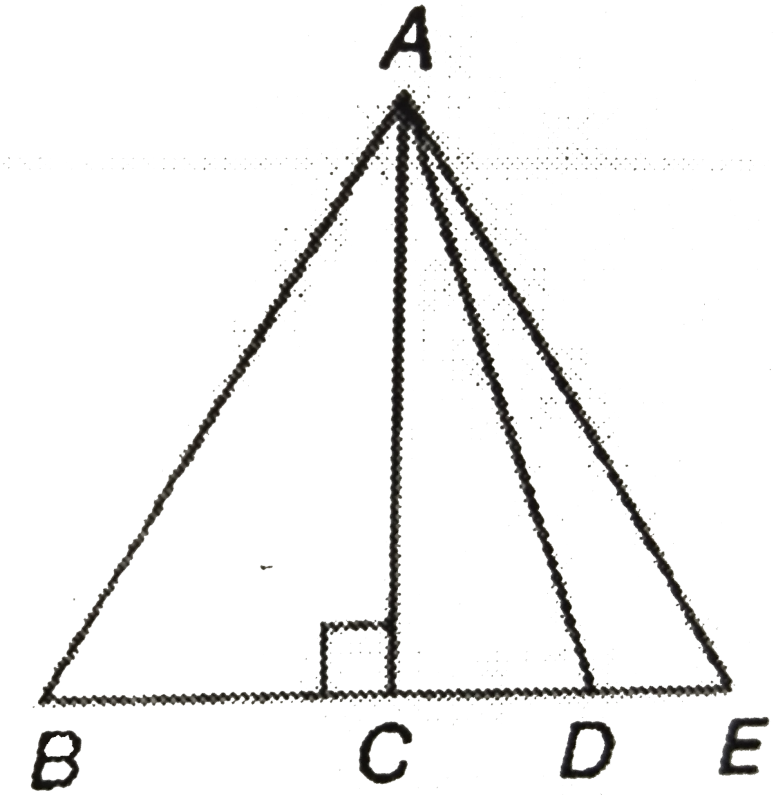
5. In the given figure (not to scale), AC is the median as well as altitude to BD. In $\triangle ACE$, AD is the median to CE. Which of the following is true?



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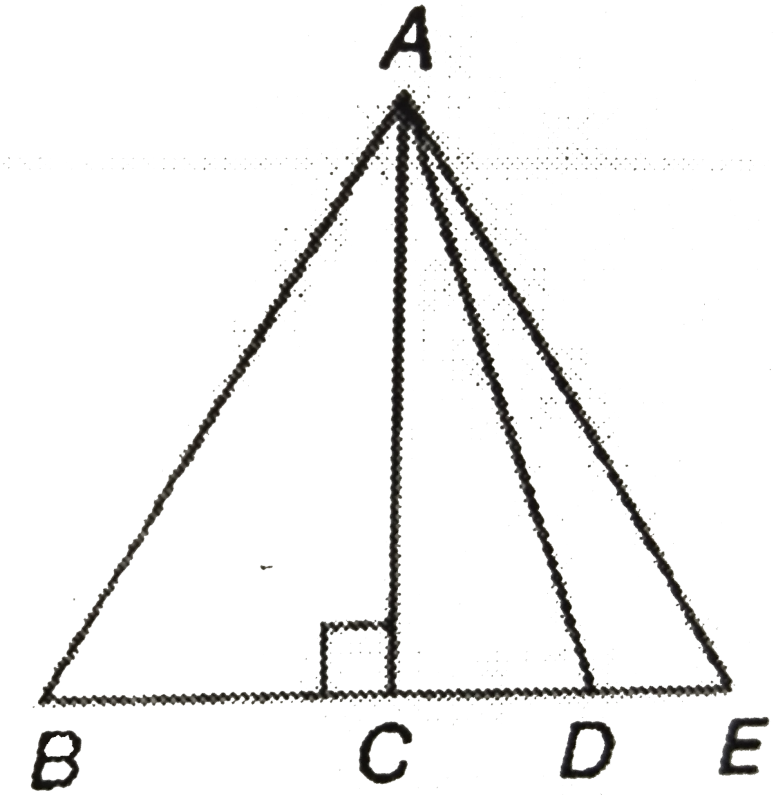
6. In the given figure (not to scale), AC is the median as well as altitude to BD. In $\triangle ACE$, AD is the median to CE. Which of the following is true?



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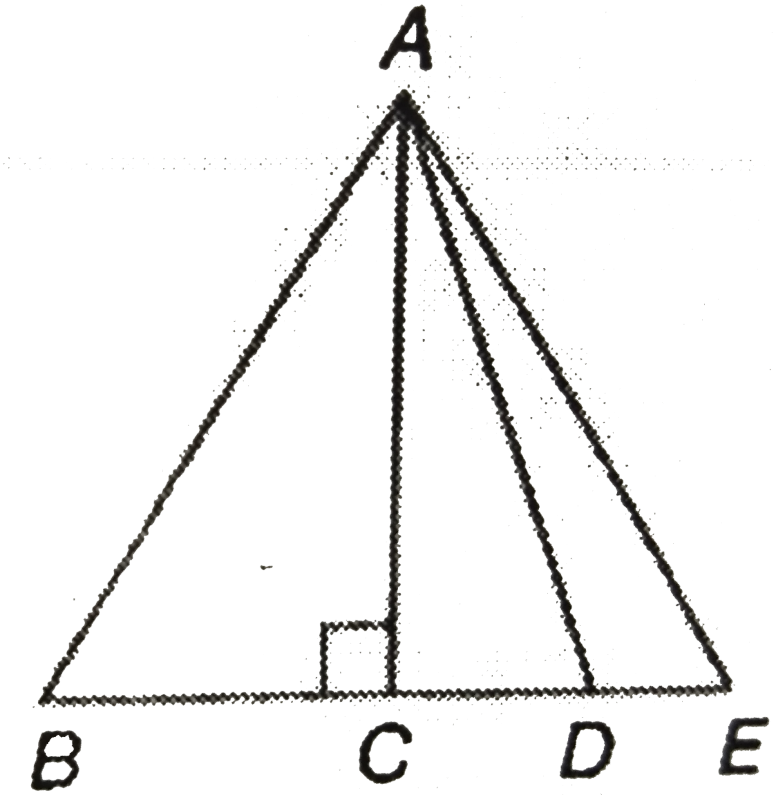
7. In the given figure (not to scale), AC is the median as well as altitude to BD. In $\triangle ACE$, AD is the median to CE. Which of the following is true?



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8. Prove that the sum of the squares of the diagonals of parallelogram is equal to the sum of the squares of its sides.

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9. In Figure, two chords AB and CD intersect each other at the point P. Prove that: (i) $\Delta APC \Delta DPB$ (ii) $AP \cdot PB = CP \cdot DP$

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10. In Figure two chords AB and CD of a circle intersect each other at the point P (when produced) outside the circle. Prove that(i) $\Delta PAC \Delta PDB$ (ii) $P\dot{A}\dot{P}B = P\dot{C}\dot{P}D$

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11. In figure D is a point on side BC of a ΔABCsuch that $\frac{BD}{CD} = \frac{AB}{AC}$. Prove that AD is the bisector of $\angle BAC$.

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12. Nazinia 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 h

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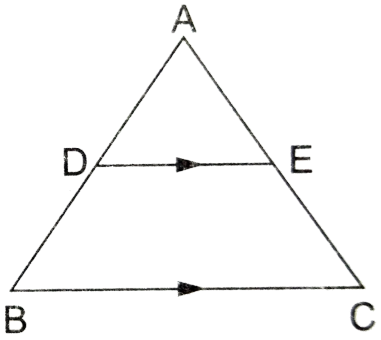
Exercise Multiple Choice Questions Level 1

1. In $\Delta ABC, DE \| BC$ so that $AD = = 2.4cm, AE = 3.2cm$ and $EC = 4.8cm$, then , AB= ?



A. $3.6cm$

B. 6 cm

C. 6 . 4 cm

D. 1. 6 cm

Answer: B

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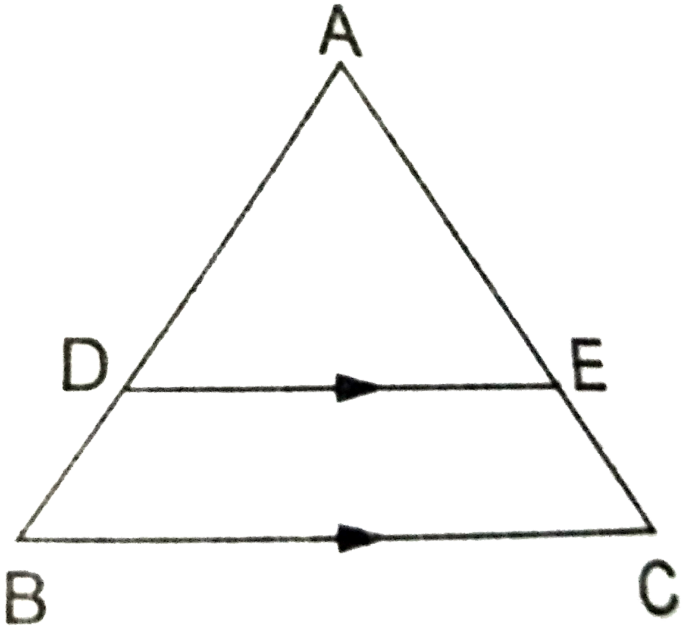
2. In $\Delta ABC, DE \| BC$ so that $AD = (7x - 4)cm, AE = (5x - 2)cm, DB = (3x + 4)cm$ and $EC = 3x$. Then, we have



A. 3

B. 5

C. 4

D. 25

Answer: C

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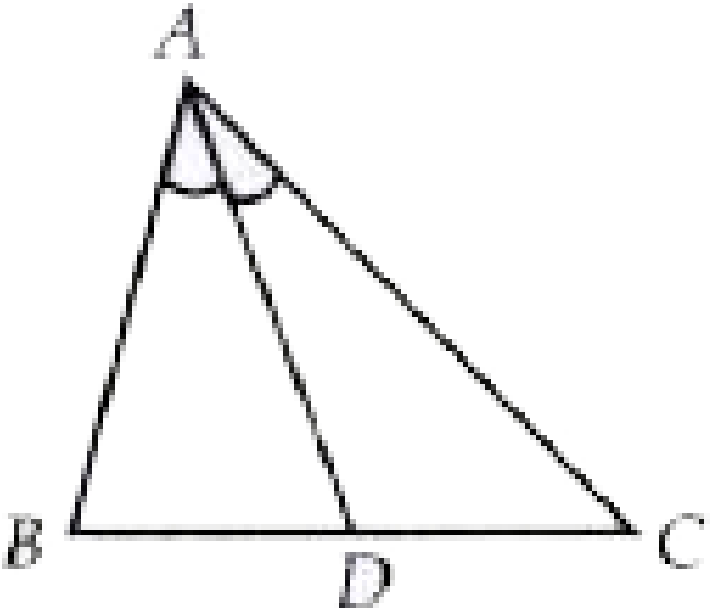
3. In ΔABC, AD is the inernal besector of $\angle A$. If BD = 5cm , BC=7.5 cm , then AB:AC=



A. $2:1$

B. $1:2$

C. $4:5$

D. $3:5$

Answer: A

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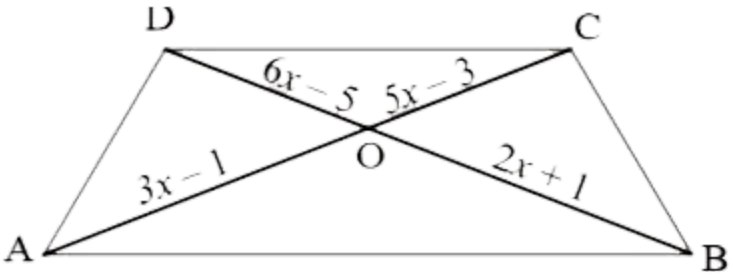
4. In the given fig., AB || DC and diagonals AC and BD intersects at O. If OA =3x-1 and OB =2x + 1, OC = 5x-3 and OD =6x-5, find the value of x.



A. 2

B. 3

C. 2.5

D. 3.5

Answer: A

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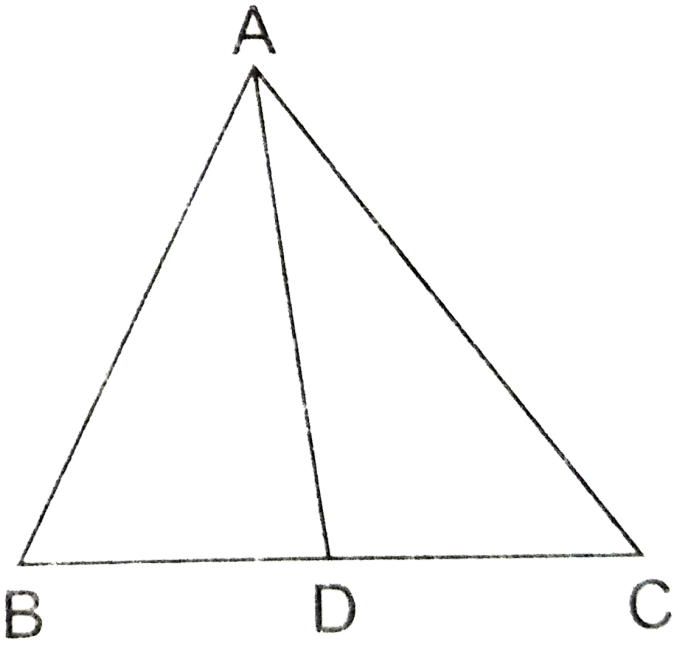
5. In ΔABC it is given that $\frac{AB}{AC} = \frac{BD}{DC}$. If $\angle B = 70^\circ$ and $\angle C = 50^\circ$ then $\angle BAD = ?$



A. 30°

B. 40°

C. 50°

D. 45°

Answer: A

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6. In ΔABC, AD is the bisector of $\angle A$. Then , $\frac{ar(\Delta ABD)}{ar(\Delta ACD)} =$

A. $\frac{AB^2}{AC^2}$

B. $\frac{AB}{AC}$

C. $\frac{BM}{CM}$

D. None of these

Answer: B

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7. $\Delta ABC \sim \Delta DEF$ and the perimeters of $\Delta ABCd$ and ΔDEF are 30 cm and 18 cm respectively. If $BC = 9cm$, then EF=?

A. 6 . 3 cm

B. 5 . 4 cm

C. 7 . 2 cm

D. 4 . 5 cm

Answer: B

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8. $\Delta ABC \sim \Delta DEF$ such that AB = 9.1 cm and DE =6.5 cm. If the perimeter of ΔDEF is 25 cm, what is the perimeter of ΔABC?

A. 35 cm

B. 28 cm

C. 42 cm

D. 40 cm

Answer: A

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9. A vertical stick 20 m long casts a shadow 10m long on the ground. At the same time, a tower casts a shadow 50m long on the ground. The

height of the tower is (a) 100m (b) 120m (c) 25m (d) 200m

A. 100 m

B. 120 m

C. 25 m

D. 200 m

Answer: A

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10. Two isosceles triangles have equal angles and their areas are in the ratio $36:81$ .The ratio of their correrresponding heights is

A. $2:3$

B. $5:4$

C. $3:2$

D. $1:4$

Answer: A

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11. If ABC and DEF are similar such that $2\,AB = DE$ and $BC = 8cm$, then $EF =$ (a) 16cm (b) 12cm (c) 8cm (d) 4cm.

A. 16 cm

B. 12 cm

C. 8 cm

D. 4 cm

Answer: A

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12. In ABC, a line XY parallel to BC cuts AB at X and AC at Y. If BY bisects $\angle XYC$, then $BC = CY$ (b) $BC = BY$ (c) $BC \neq CY$ (d)

$BC \neq BY$

A. BC =CY

B. BC =BY

C. $BC \neq CY$

D. None of these

Answer: A

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13. Let ABC be an equilateral triangel. Let $BE \perp CA$ meeting CA at E, then $\left(AB^2 + BC^2 + CA^2\right)$ is equal to :

A. $3BE^2$

B. BE^2

C. BE^2

D. $6BE^2$

Answer: C

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14. A right triangle has hypotenuse of length $p\,cm$ and one side of length $q\,cm$. If $p - q = 1$, find the length of the third side of the triangle.

A. $\sqrt{2q+1}$

B. $\sqrt{2p+1}$

C. 2p

D. $1 + q$

Answer: A

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

A. A

B. B

C. C

D. None of these

Answer: C

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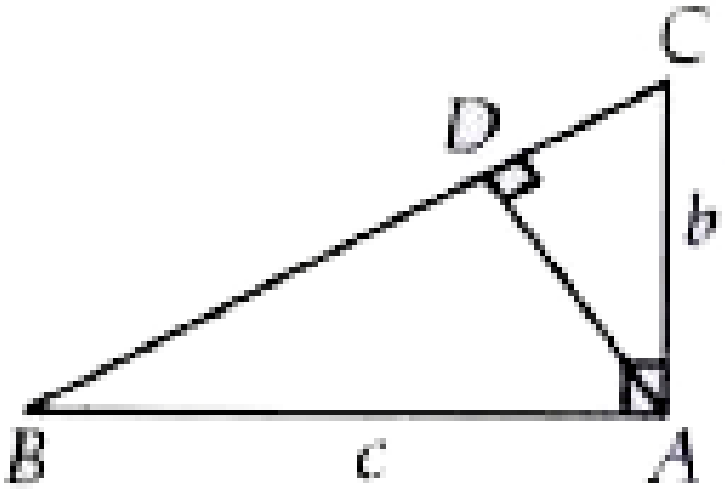
16. ΔABC is a right triangle , right angled at A and $AD \perp BC$. If AB= c and AC = b, then AD is equal to



A. $\frac{bc}{\sqrt{b^2+c^2}}$

B. $\frac{bc}{b^2+c^2}$

C. $\frac{b^2c}{\sqrt{b^2+c^2}}$

D. None of these

Answer: A

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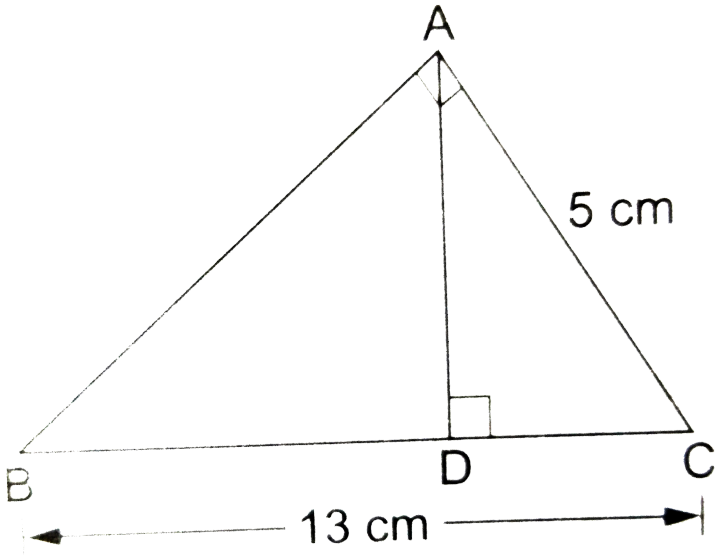
17. ΔABC is right-angled at A and $AD \perp BC$. If $BC = 13cm$ and $AC = 5cm$, find the ratio of areas of ΔABC and ΔADC.



A. $25:169$

B. $169:25$

C. $5:12$

D. $13:5$

Answer: B

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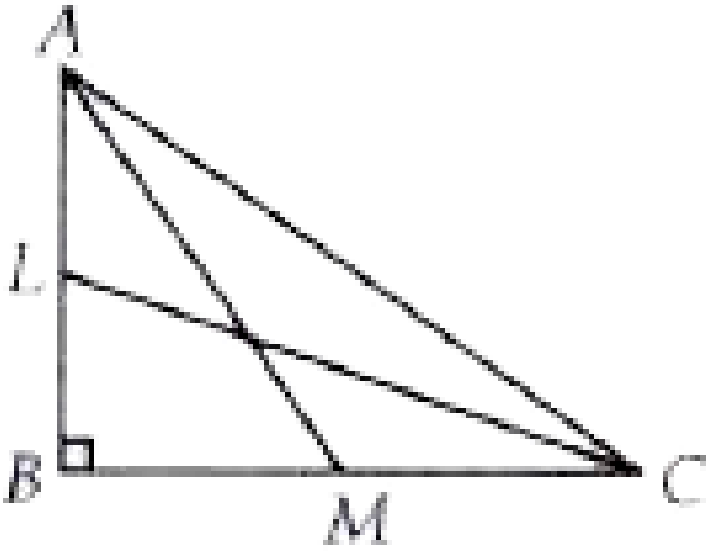
18. L and M are the mid points of AB and BC respectively of ΔABC , right angled at B . $4LC^2 =$



A. $AB^2 + 4BC^2$

B. $BC^2 + 4AB^2$

C. $AC^2 + 4AB^2$

D. None of these

Answer: A

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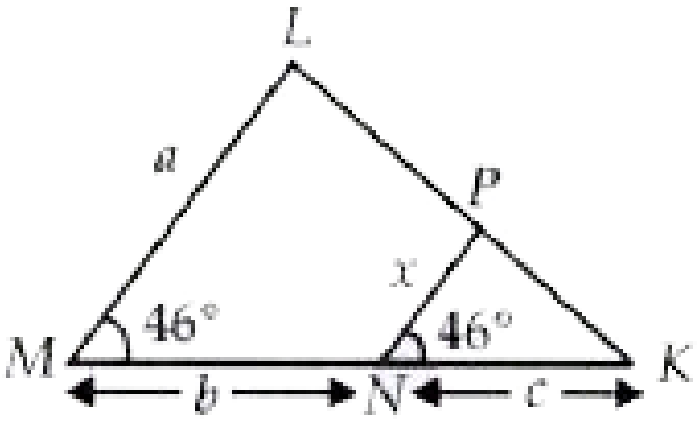
19. In the given figure , x in terms of a , b and c is



A. $x = \frac{ac}{b+c}$

B. $x = \frac{ab}{b+c}$

C. $x = \frac{ac}{a+b}$

D. $x = \frac{bc}{a+c}$

Answer: A

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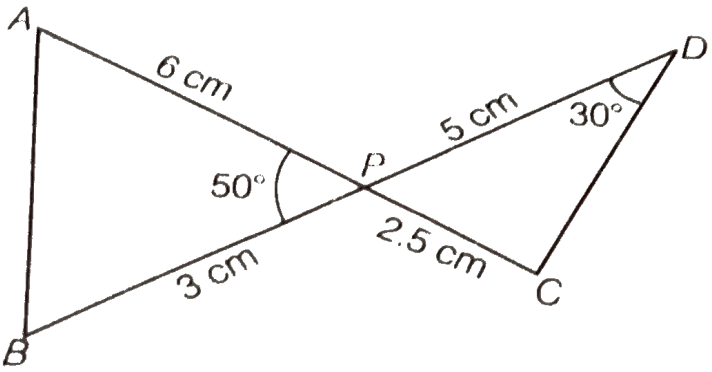
20. In figure, two line segments AC and BD intersects each other at the point P such that PA = 6 cm, PB = 3 cm, PC = 2.5 cm, PD=5 cm, $\angle APB = 50^\circ$ and $\angle CDP = 30^\circ$. Then, $\angle PBA$ is equal to



A. 50°

B. 30°

C. 60°

D. 100°

Answer: D

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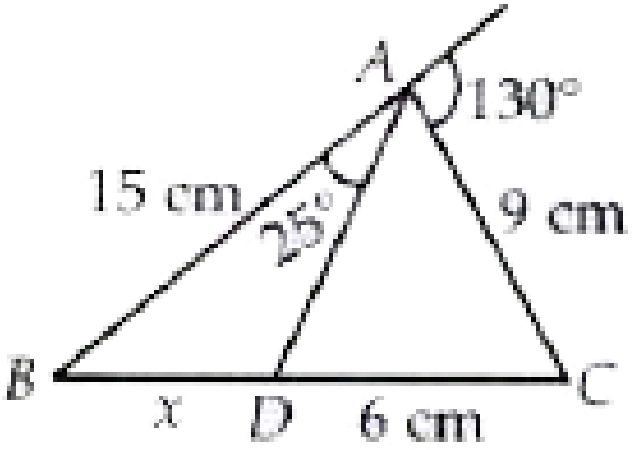
21. In the given figure , value of x is



A. 8 cm

B. 4 cm

C. 10 cm

D. None of these

Answer: C

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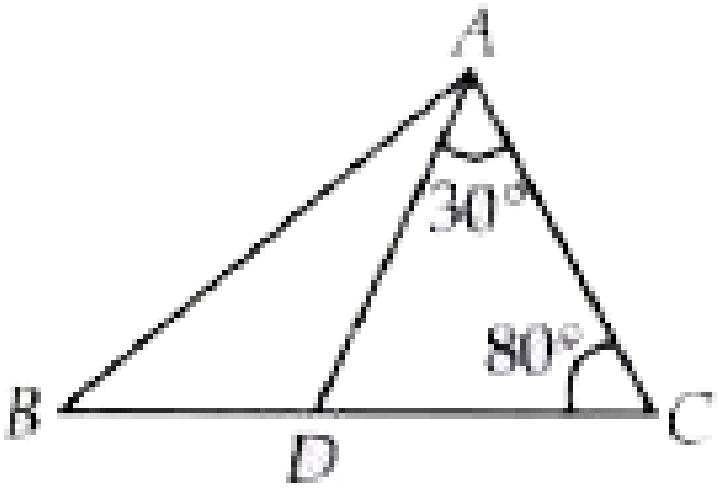
22. In the given figure , if $\frac{AB}{AC} = \frac{BD}{CD}$, then $\angle ABD =$



A. 50°

B. 40°

C. 30°

D. 70°

Answer: B

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23. The point in the plane of a triangle which is at equal perpendicular distance from the sides of the triangle is :

A. just one such point (b)

B. three such points

C. four such points

D. None of these

Answer: A

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24. PSR is a triangle right angled at s . D is the mid -point of SR .If the bisector of $\angle PSR$ and perpendicular bisector of SR meet at O , then ΔOSD is

A. scalene

B. equilateral

C. isosceles right angled

D. acute -angled

Answer: C

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25. An isosceles triangle has a 10 inches base and two 13 inches sides .What other value can the base have and still yields a triangle with the same areas ?

A. 18 inches

B. 19 inches

C. 24 inches

D. 27 inches

Answer: C

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26. If the ratio of the perimeter of two similar triangles is 4:25, then find the ratio of the areas of the similar triangles.

A. $16:625$

B. $2:5$

C. $5:2$

D. $625:16$

Answer: A

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27. In $\Delta ABC, \angle B = 90^\circ$ and $BD \perp AC$. If DC=7 cm and AD = 3 cm , then the length of BD is

A. $\sqrt{23}cm$

B. $\sqrt{21}cm$

C. $\sqrt{7}cm$

D. 21 cm

Answer: B

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28. In which of the following options ,DE ||AB where D and E lie on the sides AC and BC of ΔABC respectively ?

A. AD = 6 , EC = 14 , BC = 18 , DC = 21

B. BE = 20 , Dc = 10 , AC = 25 , BC =36

C. AC = 10 , Dc = 4 , EC =2 , BC =6

D. None of these

Answer: A

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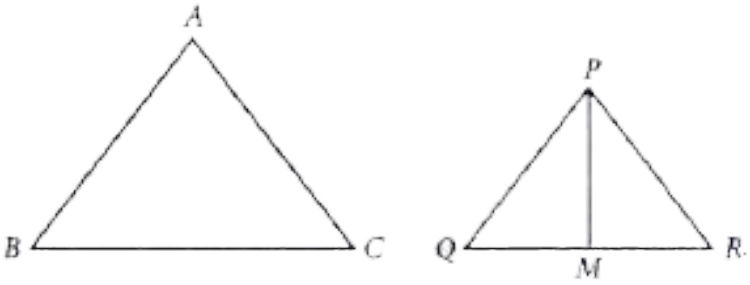
29. In the given figure , $\Delta ABC \sim \Delta PQR$,PM is median of ΔPQR . If ar $(\Delta ABC) = 289cm^2, BC = 17cm, MR = 6.5cm$, then the area of ΔPQM is



A. $169cm^2$

B. $13cm^2$

C. $84.5cm^2$

D. $144.5cm^2$

Answer: C

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30. In a rectangle ABCD , E is the mid -point of AB . If AB= 16 m and AD = 6 m , then find ED .

A. 15 cm

B. 10 cm

C. 12 m

D. 14 m

Answer: B

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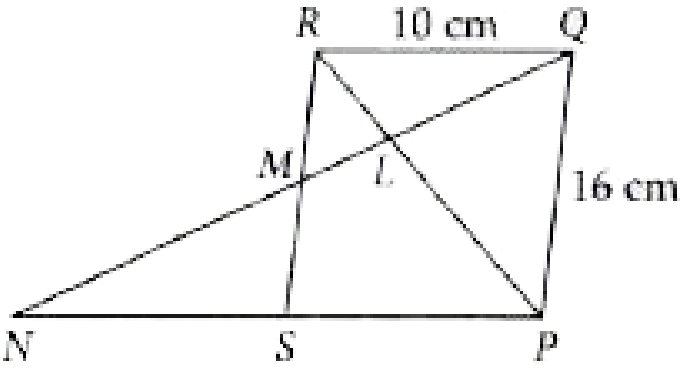
31. In the given figure , PQRS is a parallelogram with PQ = 16 cm and QR = 10 cm . L is a point on PR such that RL:LP=2:3QL is produced to meet RS at M and PS produced at N . Find the length of PN and RM (in cm)

respectively .



A. $16, 10\frac{2}{3}$

B. $10, 10\frac{2}{3}$

C. $15, 10\frac{2}{3}$

D. $15, \frac{1}{3}$

Answer: C

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32. The perimeters of two similar triangles are 30 cm and 20 cm . If one altitude of the former triangle is 12 cm , then the length of the

corresponding altitude of the latter triangle is

A. 8 cm

B. 10 cm

C. 12 cm

D. 15 cm

Answer: A

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33. The length of the diagonal of a square is $7\sqrt{2}$ cm . Then , the area of the square in cm^2 is

A. 28

B. $14\sqrt{2}$

C. 21

D. 49

Answer: D

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34. A man goes 15 m due east and then 20 m due north .find his distance from the starting point .

A. 35 m

B. 5 m

C. 25 m

D. 15 m

Answer: C

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35. In $\Delta ABC$and ΔDEF, if $\angle A = 50^\circ, \angle B = 70^\circ, \angle C = 60^\circ, \angle D = 60^\circ, \angle E = 70^\circ$ and $\angle F = 50^\circ$

, then

A. $\Delta ABC \sim \Delta DEF$

B. $\Delta ABC \sim \Delta EDF$

C. $\Delta ABC \sim \Delta DEF$

D. $\Delta ABC \sim \Delta FED$

Answer: D

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Exercise Multiple Choice Questions Level 2

1. In a ΔABC , point D is on side AB and point E is on side Ac , such that BCED is a trapezium . If DE : BC = 3 : 5 , then area (ΔADE) : area $(\Delta BCED)$=

A. $3:4$

B. $9:16$

C. $3:5$

D. $9:25$

Answer: B

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2. $ABCD$ is a trapezium such that $BCAD$ and $AB = 4cm$. If the diagonals AC and BD intersect at O such that $\frac{AO}{OC} = \frac{DO}{OB} = \frac{1}{2}$, then $BC =$ $7cm$ (b) $8cm$ (c) $9cm$ (d) $6cm$

A. 7 cm

B. 8 cm

C. 9 cm

D. 6 cm

Answer: C

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3. In Fig. 4.142, PA, QB and RC are each perpendicular to AC . Prove that $\frac{1}{x}+\frac{1}{z}=\frac{1}{y}$. (FIGURE)

A. $1/5y$

B. $1/2y$

C. $1/y$

D. None of these

Answer: C

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4. The area of a right angled triangle is 6 sq . Cm and its perimeter is 12 cm . The length of its hypotenuse is

A. 6 cm

B. 5 cm

C. 2 cm

D. Data insufficient

Answer: B

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5. If A be the area of a right triangle and b one of the sides containing the right angle, prove that the length of the altitude on the hypotenuse is $\frac{2AB}{\sqrt{b^4+4A^2}}$

A. $\frac{2b}{\sqrt{b^4+4x^2}}$

B. $\frac{2bx}{\sqrt{b^4-4x^2}}$

C. $\frac{4bx}{\sqrt{b^2+4x^2}}$

D. $\frac{2bx}{\sqrt{b^4+4x^2}}$

Answer: D

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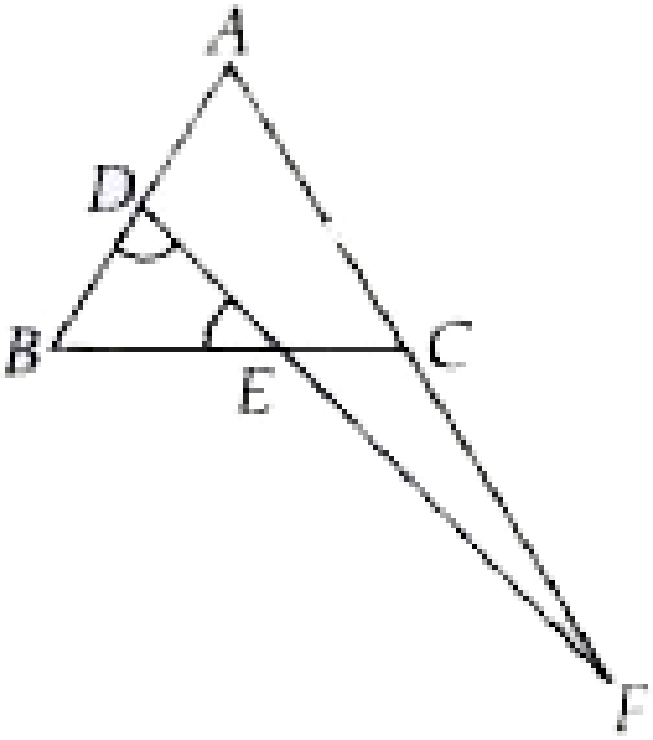
6. In the figure , $\angle BED = \angle BDE$ and E divides BC in the ratio $2:1$.

Then , $AF \times BE =$



A. $AD \times CF$

B. $2BD \times CE$

C. $2AD \times AC$

D. $2AD \times CF$

Answer: D

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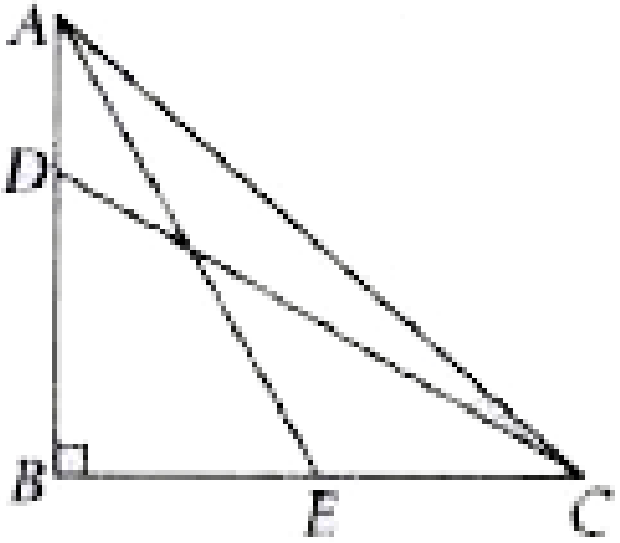
7. In ΔABC (in the figure) , $\angle B = 90^\circ$, AE=CD=13 cm , BE =AD =5 cm .

Then BC=



A. $2\sqrt{30}cm$

B. $\sqrt{30}cm$

C. $3\sqrt{30}cm$

D. None of these

Answer: A

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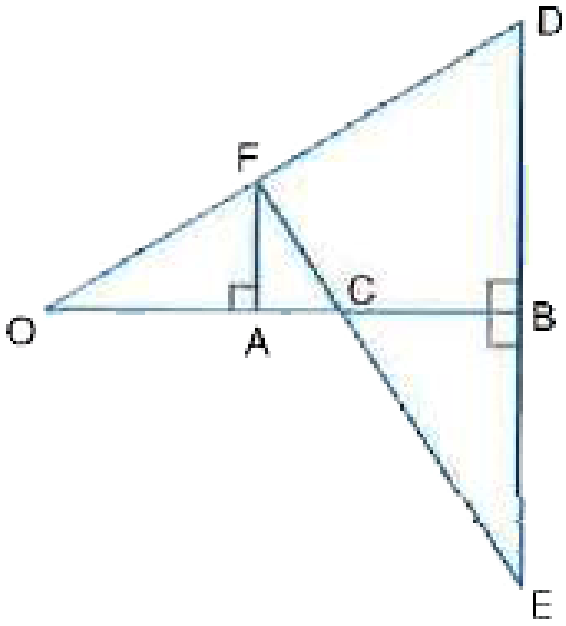
8. In the Fig. given below, OB is the perpendicular bisector of the line segment DE, $FA \perp OB$ and FE intersects OB at the point C. Prove that

$$\frac{1}{OA}+\frac{1}{OB}=\frac{2}{OC}$$



A. 0

B. $\frac{1}{OC}$

C. $\frac{2}{OC}$

D. None of these

Answer: C

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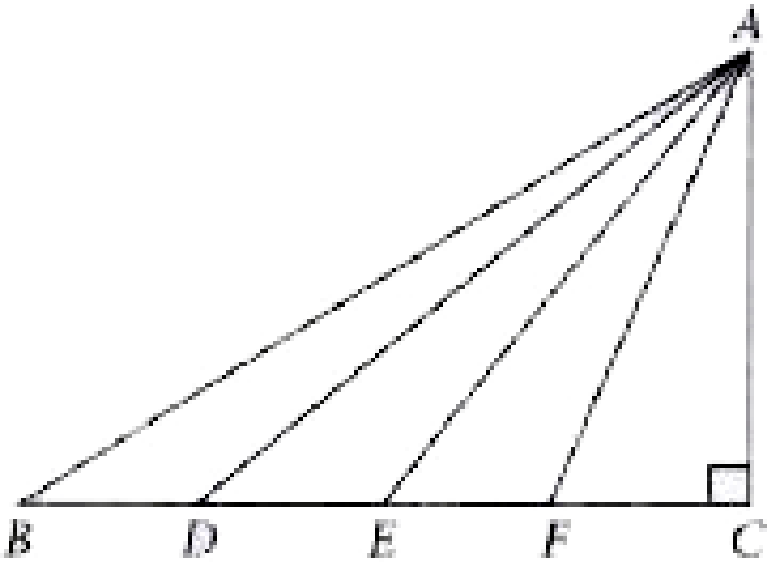
9. In right angled $\Delta ABC, \angle C = 90^\circ$ and D, E, F are three points on BC such that they divide it in equal parts .Then $8\left(AF^2 + AD^2\right) =$



A. $AC^2 + AB^2$

B. $11AC^2 + 5AB^2$

C. $10AC^2 + 5AB^2$

D. None of these

Answer: B

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10. In ΔDEF, L is a point on side DE such that LM||DDFandLN||EF. If MN meets ED in O when produced , then $OD \times OE =$

A. OL^2

B. LD^2

C. DN^2

D. None of these

Answer: A

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11. S and U are two points on the side PQ of ΔPQR , such that QU=PS . If ST||QR and $UV \mid \mid PR$, then

A. TV||PQ

B. $TV \perp PQ$

C. TV and PQ intersect at 60°

D. TV and PQ intersect at 45°

Answer: A

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12. A girl of height 90 cm is walking away from the base of a lamp post at a speed of 1.2 m/sec. If the lamp post is 3.6m above the ground, find the length of her shadow after 4 seconds.

A. 1 m

B. 1.2 m

C. 1.6 m

D. 2 m

Answer: C

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13. In a trapezium ABCD ,AB||CDandDC=3AB.EF||AB intersects DA and CB at E and F such that $\frac{BF}{FC} = \frac{2}{3}$. Then 3DC=

A. 4EF

B. 2EF

C. 5Ef

D. EF

Answer: C

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14. Two triangles ABC and DBC are on the same base BC and on the same side of BC in which $\angle A = \angle D = 90^\circ$. If CA and BD meet each other at E, show that $AE.\ EC = BE.\ ED$.

A. $BE \times ED$

B. $BE \times BD$

C. $BE \times CE$

D. None of these

Answer: A

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15. If S is a point on side PQ of a ΔPQR such that PS=QS=RS, then

A. $PR \cdot QR = RS^2$

B. $QS^2 + RS^2 = QR^2$

C. $PR^2 + QR^2 = PQ^2$

D. $PS^2 + RS^2 = PR^2$

Answer: C

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Exercise Match The Following

1. List -I and List -II are given as options (a) , (b) , (c) and (d) out of which one is correct .

	List-I		List-II
(P)	All circles are	(1)	parallel to third side
(Q)	If the areas of two similar triangles are equal they are	(2)	similar
(R)	If a line divides any two sides of a triangle in the same ratio, then the line is	(3)	divide each other proportionally
(S)	Diagonals of a trapezium	(4)	congruent

A. P-2,Q-4,R-1,S-3

B. P-1 ,Q-2 , R-3 , S-4

C. P-4 ,Q-3,R-2 , S-1

D. P-1 ,Q-3 , R-2 , S-4

Answer: A

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2. If in a ΔABC, $DE \mid\mid BC$ and intersects AB at D and AC at E , then match the lists :

List-I		List-II	
(P)	$\frac{AD}{DB}$	(1)	$\frac{AC}{AE}$
(Q)	$\frac{AB}{AD}$	(2)	$\frac{AE}{EC}$
(R)	$\frac{DB}{AB}$	(3)	$\frac{AB}{AC}$
(S)	$\frac{AD}{AE}$	(4)	$\frac{EC}{AC}$

A. P-1 , Q-2 , R-3, S-4

B. P-4 , Q-3 , R-2 , S-1

C. P-2 , Q-1,R-4 ,S-3

D. P-1 , Q-3 , R-2 , S-4

Answer: C

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3. Match the lists

List-I	List-II
(P) In ΔABC and ΔPQR $\frac{AB}{PQ} = \frac{AC}{PR}, \angle A = \angle P$ $\Rightarrow \Delta ABC \sim \Delta PQR$	(1) AA similarity criterion
(Q) In ΔABC and ΔPQR $\angle A = \angle P, \angle B = \angle Q$ $\Rightarrow \Delta ABC \sim \Delta PQR$	(2) SAS similarity criterion
(R) In ΔABC and ΔPQR $\frac{AB}{PQ} = \frac{AC}{PR} = \frac{BC}{QR}$ $\Rightarrow \Delta ABC \sim \Delta PQR$	(3) SSS similarity criterion
(S) In ΔABC, $DE \parallel BC$ $\Rightarrow \frac{AD}{BD} = \frac{AE}{CE}$	(4) BPT

A. P-1 , Q-2 , R-3 ,S-4

B. P-2 , Q-1 , R-3 , S-4

C. P-4 , Q-3 , R-2 , S-1

D. P-1 , Q-3 , R-2 , S-4

Answer: B

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Exercise Assertion Reason Type

1. Assertion : All regular polygons of the same number of sides such as equilateral triangles , squares etc . Are similar .

Reason : Two polygons are said to be similar if their corresponding angles are equal and lengths of corresponding sides are proportional .

A. If both assertion and reason are true and reason is the correct explanation of assertion .

B. If both assertion and reason are true but reason is not the correct explanation of assertion .

C. If assertion is true reason is false .

D. If assertion is false but reason is true .

Answer: A

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2. Assertion : If the areas of two similar triangles are equal , they are congruent .

Reason : Area of similar triangles are proportiona to their corresponding sides .

A. If both assertion and reason are true and reason is the correct explanation of assertion .

B. If both assertion and reason are true but reason is not the correct explanation of assertion .

C. If assertion is true reason is false .

D. If assertion is false but reason is true .

Answer: C

View Text Solution

3. Any line parallel to the parallel sides of a trapezium divides the non-parallel sides proportionally.

A. If both assertion and reason are true and reason is the correct explanation of assertion .

B. If both assertion and reason are true but reason is not the correct explanation of assertion .

C. If assertion is true reason is false .

D. If assertion is false but reason is true .

Answer: A

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4. Assertion : If a line divides any two sides of a triangle in the same ratio , then the line is paralle to third side .

Reason : Line segment joining the mid -point of any two sides of a triangle is parallel to the third side .

A. If both assertion and reason are true and reason is the correct explanation of assertion .

B. If both assertion and reason are true but reason is not the correct explanation of assertion .

C. If assertion is true reason is false .

D. If assertion is false but reason is true .

Answer: B

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5. Prove that the internal bisector of the angle A of a triangle ABC divides BC in the ratio AB:AC

A. If both assertion and reason are true and reason is the correct explanation of assertion .

B. If both assertion and reason are true but reason is not the correct explanation of assertion .

C. If assertion is true reason is false .

D. If assertion is false but reason is true .

Answer: C

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Exercise Comprehension Type

1. The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides .

If $\Delta ABC \sim \Delta DEF, BC = 3cm, EF = 4cm$ and area of $\Delta ABC = 54cm^2$, then the area of ΔDEF is

A. $96cm^2$

B. $106cm^2$

C. $86cm^2$

D. $76cm^2$

Answer: A

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2. The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides .

If $\Delta ABC \sim \Delta DEF$, the area of ΔABC is $9cm^2$, the area of ΔDEF is $16cm^2$ and $BC = 2.1$ cm , then the length of EF is

A. 2 . 5 cm

B. 2 . 8 cm

C. 3 . 2 cm

D. 3.5 cm

Answer: B

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3. Sides of two similar triangles are in the ratio $7:8$ .Areas of these triangles are in the ratio

A. $8:7$

B. $49:64$

C. $7:15$

D. $64:49$

Answer: B

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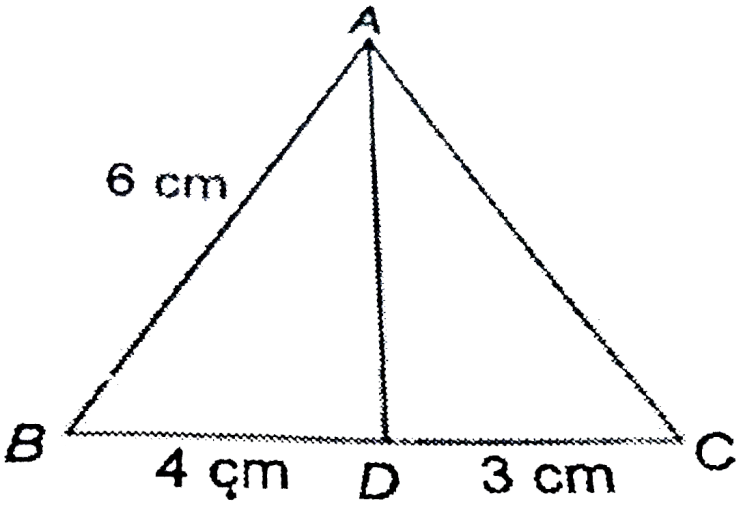
4. In the given figure AD is the bisector of $\angle A$. If BD= 4 cm , DC = 3 cm and AB = 6cm . Find AC.



A. $4.5cm$

B. $3.5cm$

C. $4.8cm$

D. $3.2cm$

Answer: A

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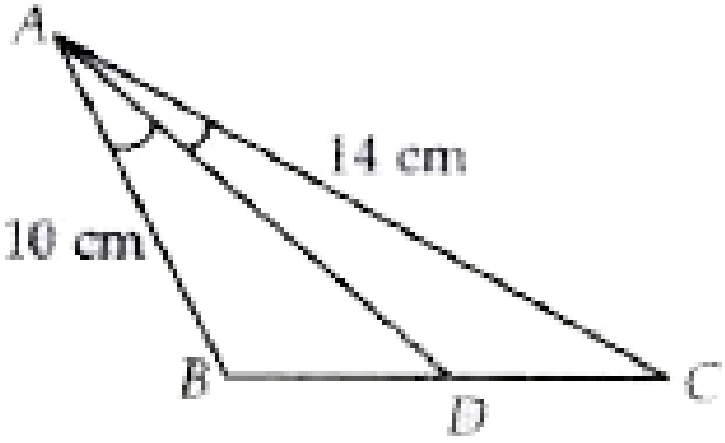
5. In the given figure , Ad is the bisector of $\angle BAC$. If AB = 10 cm , AC = 14 cm and BC = 8 cm , find BD and DC respectively .



A. $4.\ 7cm, 3.3cm$

B. $3.3cm, 4.7cm$

C. $4.\ 3cm, 3, 5cm$

D. $3.\ 5cm, 4.3cm$

Answer: B

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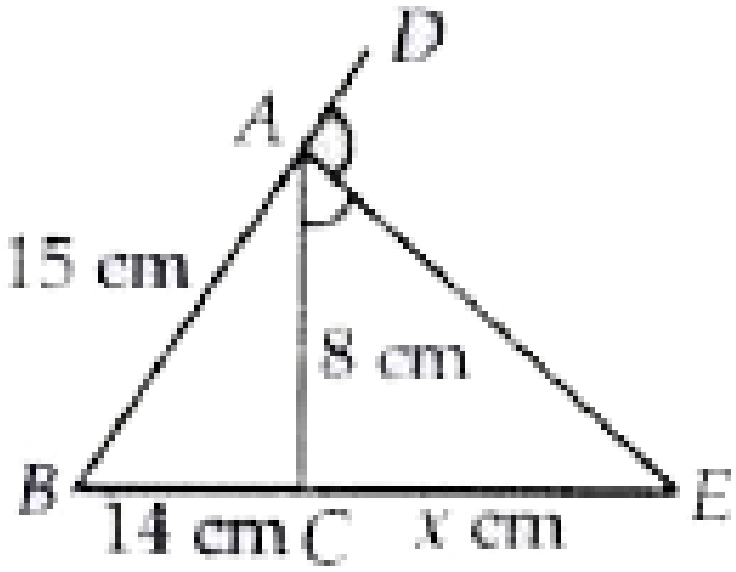
6. The internal /external bisector of an angled of a triangle divides the opposite side internally / externally in the ratio of the sides containing the angle .

In the given figure ,Ae is the bisector of the exterior $\angle CAD$ meeting BC produced in E . If AB=15 cm , AC = 8 cm and BC =14 cm , find CE .



A. 12 cm

B. 16 cm

C. 20 cm

D. 18 cm

Answer: B

View Text Solution

7. The perimeters of two similar triangles ABC and PQR are respectively 36cm and 24cm. If $PQ = 10cm$, find AB.

A. 12 cm

B. 15 cm

C. 18 cm

D. 20 cm

Answer: B

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8. Two sides of a triangle are 10 cm and 15 cm and the base is 20 cm long . If another triangle similar to the first triangle has the base measuring 32 cm , then other two sides of the triangle are

A. 16 cm , 24 cm

B. 12 cm , 28 cm

C. 15 cm , 25 cm

D. 18 cm , 22 cm

Answer: A

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9. If ratio of areas of two triangles are $64:121$, then the ratio of corresponding perimeter is

A. $8:11$

B. $11:8$

C. $9:121$

D. $8:9$

Answer: A

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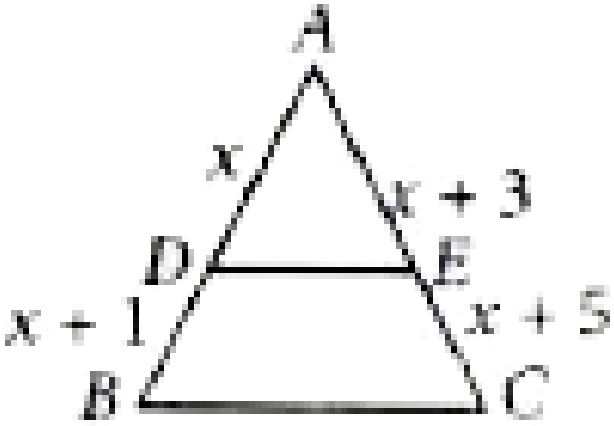
Exercise Subjective Problems Very Short Answer Type

1. In a ΔABC, $DE \mid\mid BC$, the find the value of x.



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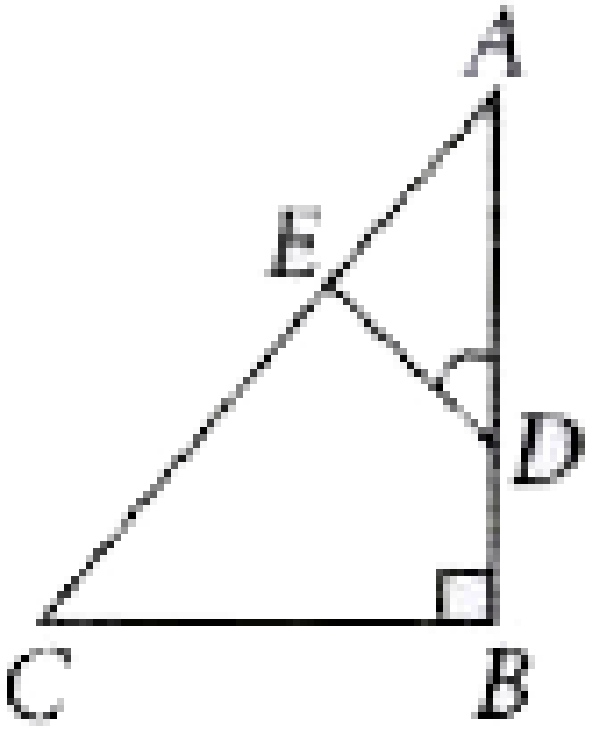
2. In ΔABC, $\angle ADE = \angle B$, then find DE if AD = 7. 6 cm , BD = 4.2 cm and BC = 8 . 4 cm.



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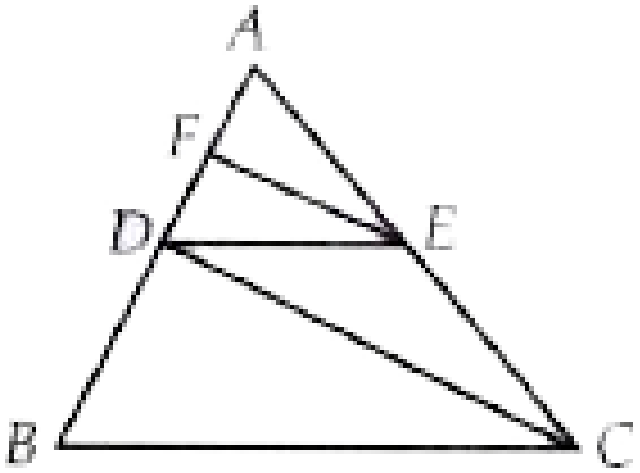
3. In figure ,DE||Bcand CD ||EF . Prove that $AD^2 = AB \times AF$.



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4. ABC is a right triangle right angled at C and AC = $\sqrt{3}BC$. Prove that $\angle ABC = 60^\circ$.

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5. In $\Delta ABC, AD \perp BC$ and $AD^2 = BD \cdot CD$. Prove that $\angle BAC = 90^\circ$.

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6. Two pillars of heights 70 m and 20 m are standing 120 m apart . Find the distance between their tops .

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7. $\Delta ABC \sim \Delta PQR$ and $ar(\Delta ABC) = 4ar(\Delta PQR)$ IF $BC = 12cm$ then find QR

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8. If the diagonal BD of a quadrillateral ABCD bisects both $\angle B$ and $\angle D$. Prove that $\frac{AB}{BC} = \frac{AD}{CD}$.

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9. In a trapezium ABCD, O is the point of intesection of AC and BD, AB||CD and $AB = 2 \times CD$. If the area of $\triangle AOB = 84cm^2$. Find the area of $\triangle COD$.

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10. A point D is on the side BC of an equilateral triangle ABC such that $DC = \frac{1}{4} BC$. Prove that $AD^2 = 13\, CD^2$.

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Exercise Subjective Problems Short Answer Type

1. P and Q are points on the sides AB and AC respectively of a $\triangle ABC$. If AP= 2cm, PB = 4cm AQ= 3cm and QC= 6cm. Show that BC= 3PQ.

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2. In ABC, D is the mid-point of $BCandED$ is the bisector of the $\angle ADBandEF$ is drawn parallel to BC cutting AC in F . Prove that $\angle EDF$ is a right angle.

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3. In Figure, $\angle BAC = 90^0, AD$ is its bisector. If $DE \perp Ac$, prove that $DExAB + AC) = ABxAC$

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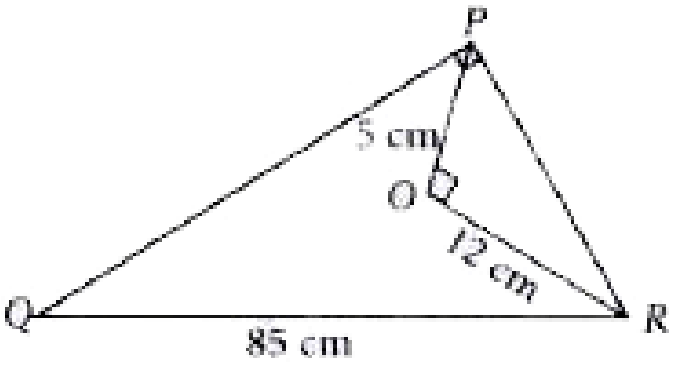
4. In given figure , OP = 5 cm and OR =12 cm and QR = 85 cm find the area of ΔPQR .



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5. In Fig. 4.123, ABCD is a trapezium with $AB \mid \mid DC$. If ΔAED is similar to ΔBEC, prove that $AD = BC$.

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6. In a $\triangle ABC$ P and Q are points on AB and AC respectively and PQ||BC. Prove that the median AD bisects PQ.

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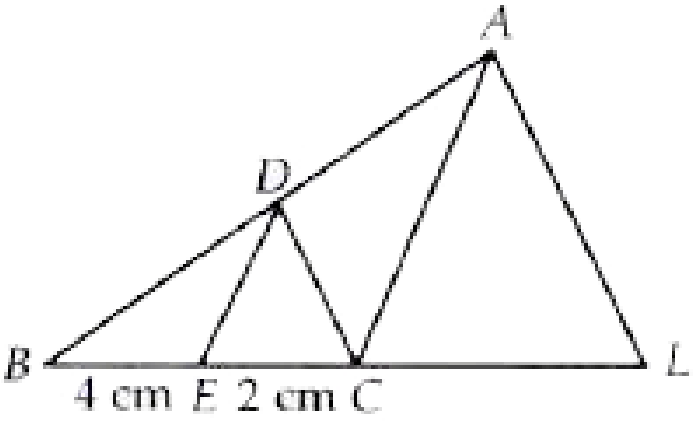
7. In figure , CD ||LA and DE||AC.find CL .



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8. In an isoscles ΔABC, $AB = AC$ and D is a point on BC. Prove that $AB^2 - AD^2 = BD \cdot CD$.

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9. In the figure given below, ΔPQR is right-angled at Q and the points S and T trisect the side QR. Prove that $8PT^2 = 3PR + 5PS^2$

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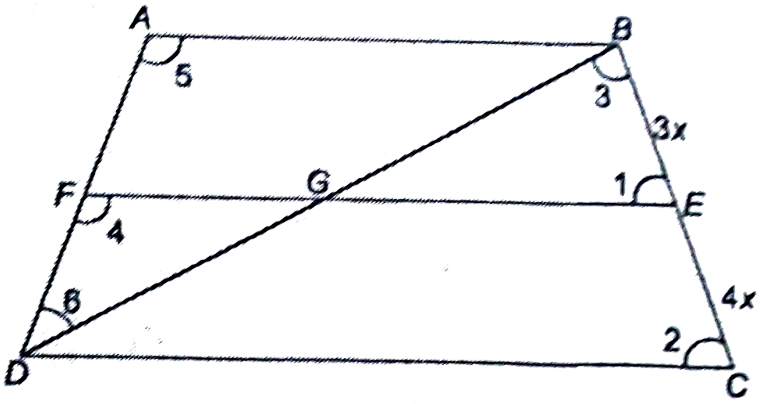
10. In trapezium ABCD. AB||DC and DC = 2AB. A line segment EF drawn parallel to AB cuts AD in F and BC in E such that $\frac{BE}{EC} = \frac{3}{4}$.

Diagonal DB intersects EF at G. prove that &EF= 10AB.



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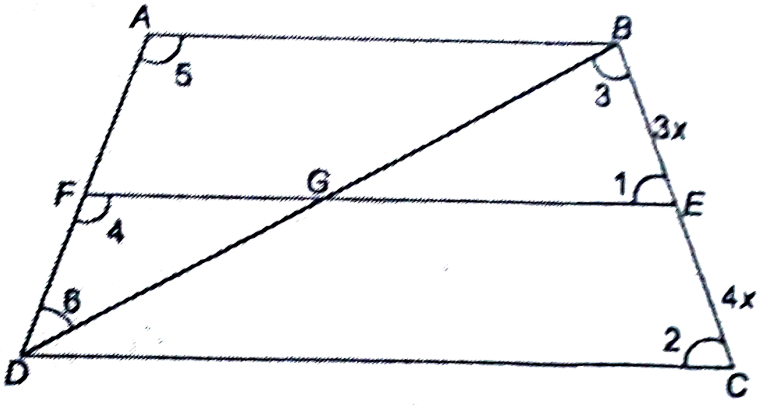
Exercise Subjective Problems Long Answer Type

1. In trapezium ABCD. AB||DC and DC = 2AB. A line segment EF drawn parallel to AB cuts AD in F and BC in E such that $\frac{BE}{EC} = \frac{3}{4}$.

Diagonal DB intersects EF at G. prove that &EF= 10AB.



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2. In a right triangle ABC , right angled at C, P and Q are the points of the sides CA and CB respectively , which divide these sides in the ratio $2:1$ Prove that

$9AQ^2 = 9AC^2 + 4BC^2$

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3. In a right triangle ABC , right angled at C, P and Q are the points of the sides CA and CB respectively , which divide these sides in the ratio $2:1$ Prove that

$9BP^2 = 9BC^2 + 4AC^2$

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4. In a right triangle ABC , right angled at C, P and Q are the points of the sides CA and CB respectively , which divide these sides in the ratio $2:1$ Prove that

$9\left(AQ^2 + BP^2\right) = 13AB^2$

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5. Two poles of height a metres and b metres are p metres apart. Prove that the height of the point of intersection of the lines joining the top of each pole to the foot of the opposite pole is given by $\frac{ab}{a+b}$ metres.

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

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7. In Fig. 7 .85, $DE||BC$ and AD : DB = 5 : 4. Find $\frac{\text{Area}(\Delta DEF)}{\text{Area}(\Delta CFB)}$

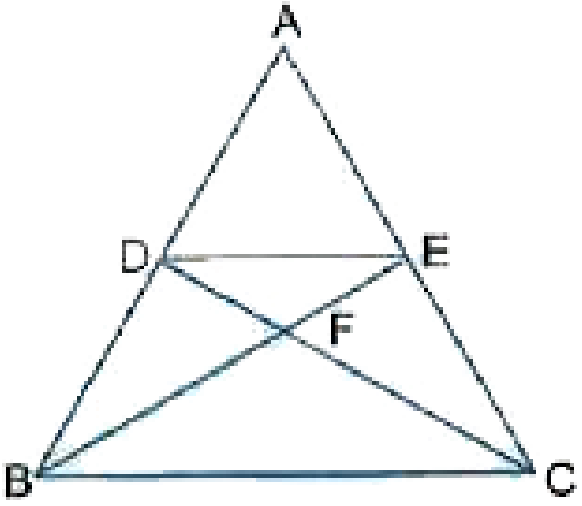

Fig. 7.85

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Exercise Integer Numerical Value Type

1. ΔABC and ΔCDE are two equilateral triangles such that D is the mid -point of BC . The ratio of the areas of ΔCDE and ΔABC is 1 : k then k =

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2. If ΔABC is an equilateral triangle such that $AD \perp BC, AD^2 = kDC^2$, then k is

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3. If each side of a rhombus is 10 cm and one of its diagonals is 16 cm , then the length of the other diagonal is k cm . Find k .

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4. A girl of height 100 cm is walking away from the base of a lamp post at a speed of 1.9 m/s . If the lamp is 5 m above the ground , find the length of her shadow after 4 seconds (in metres)

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5. If in an isosceles triangle a is the length of the base and b the length of one of the equal sides , then its area is $\frac{a}{k}\sqrt{kb^2 - a^2}$ .Find k .

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6. If corresponding sides of two similar triangles are in the ratio 4 : 5 , then corresponding medians of the triangles are in the ratio $4 : k$. Find K .

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7. P and Q are the points on sides AB and AC respectively of a ΔABC , such that PQ||BC .If $AP \mid PB = 2:3$ and AQ=4 cm , then the length of AC is ..... Cm .

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8. XY is drawn parallel to the base BC of ΔABC cutting AB at and AC at Y . If AB=4BX and YC = 2 cm , then AY is .... Cm .

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9. In ΔABC , if DE||BC , AD =x , DB =x-2,AE=x+2and EC=x-1 , then the value of x is

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10. The altitude of an equilateral triangle having the length of its side 10 cm is $K\sqrt{3}$ cm . Find K .

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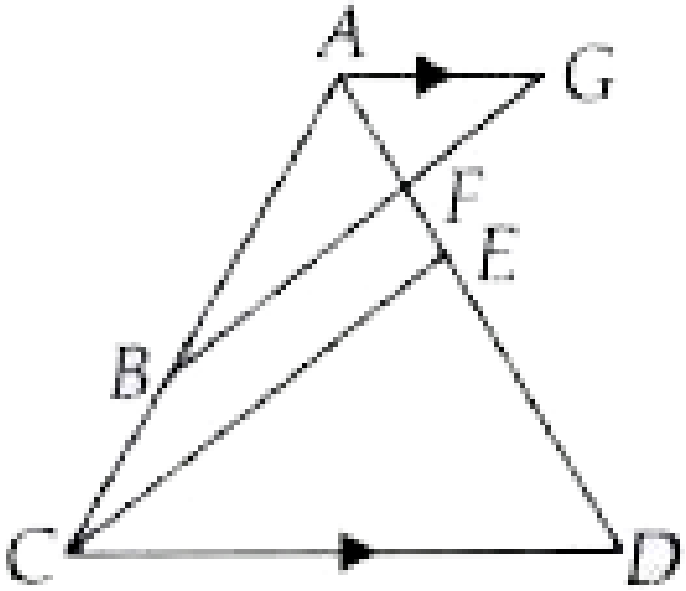
Olympiad Hots Corner

1. In the given figure (not drawn to scalse) , AG is parallel to CD and $AG = \frac{2}{7}CD$. The point B on AC is such that $BC = \frac{2}{7}AC$. If the line BG meets AD at F and the line through C is parallel to BG which meets AD

at E , then find the value of $\frac{FG}{EC}$.



A. $1/7$

B. $3/7$

C. $4/7$

D. $2/7$

Answer: D

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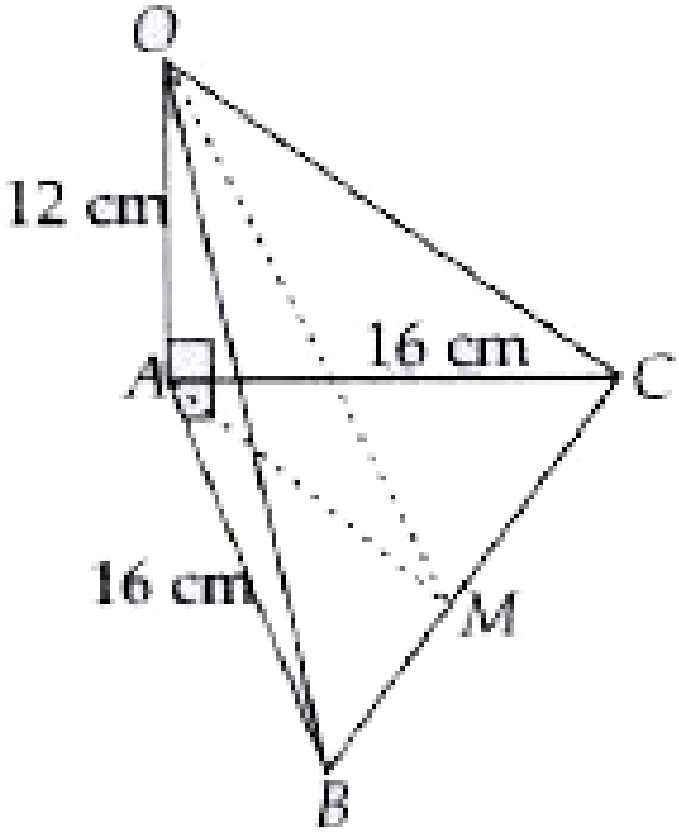
2. In the given figure (not drawn to scalse), ABC is on horizontal ground and O is vertically above A . M is the mid -point of BC . If $\angle BAC = 90^\circ$, $AB = AC = 16cm$ and OA=12 cm , calculate the length of OB .



A. 25 cm

B. 15 cm

C. 20 cm

D. 28 cm

Answer: C

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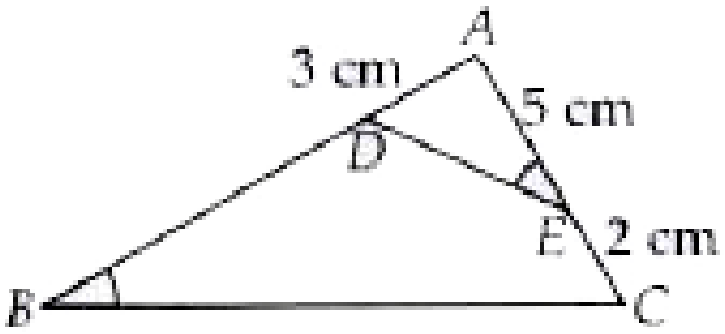
3. In the given diagram , $\angle ABC = \angle AED, AD = 3cm, AE = 5cm$ and $EC = 2cm$ .Find

(i) BD

(ii) $\frac{\text{Area of}\Delta AED}{\text{Area of}\Delta ABC}$



A. (i) $8\frac{2}{3}cm$

(ii) $\frac{9}{49}$

B. (i) $8\frac{2}{3}cm$

(ii) $\frac{9}{23}$

C. (i) $\frac{2}{5}cm$

(ii) $\frac{9}{49}$

D. (i) $\frac{2}{5}$ cm

(ii) $\frac{9}{23}$

Answer: A

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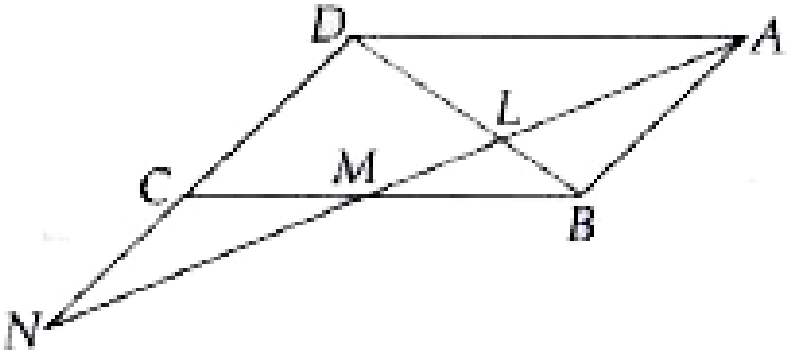
4. ABCD is a parallelogram and L is a point on DB . The produced line AL meets BC at M and DC produced at N .



Given that DL =3LB , find $\frac{AB}{CN}$.

A. $3/2$

B. $1/2$

C. $4/5$

D. $1/4$

Answer: B

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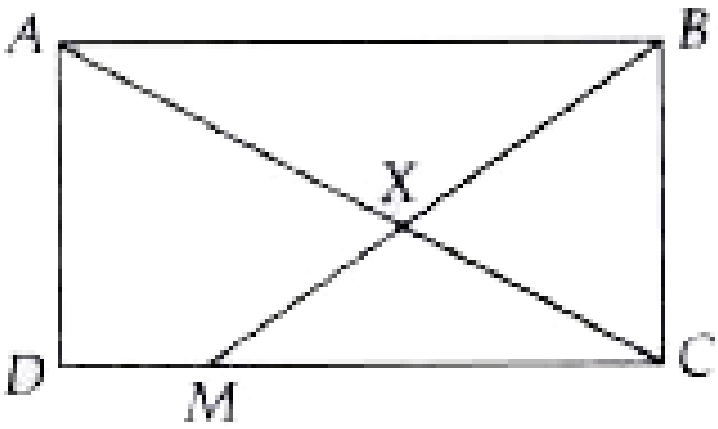
5. ABCD is a rectangle and M is a point on CD . AC and BM meet at X .



It is given that CM =3MD. Find

(i) area of ΔCXM : area of ΔAXB

(ii) area of ΔBXC : area of rectangle ABCD

A. (i) $9:16$

(ii) $3:11$

B. (i) $9:16$

(ii) $3:14$

C. (i) $16:9$

(ii) $14:3$

D. (i) $16:9$

(ii) $11:3$

Answer: B

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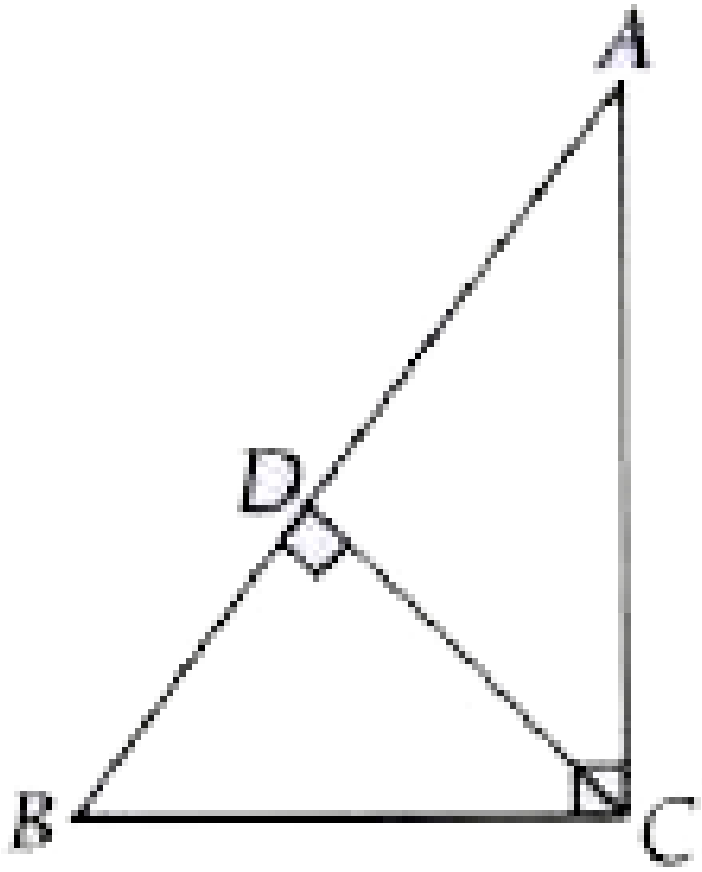
6. In $\Delta ABC, \angle ACB = 90^\circ$, $AC = 4$ and $BC = 3$, then the value of $CD \times AB$ is



A. 20

B. 15

C. 12

D. 10

Answer: C

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7. In the figure, AE is the bisector of the exterior $\angle CAD$ meeting BC produced in E. If $AB = 10cm$, $AC = 6cm$ and $BC = 12cm$, then CE is

A. 12 cm

B. 16 cm

C. 20 cm

D. 18 cm

Answer: D

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8. In $\Delta ABC, m\angle B = 90^\circ, AB = 4\sqrt{5}. BD \perp Ac, AD = 4$, then area of (ΔABC) =

A. 96 sq . Units

B. 80 sq . Units

C. 120 sq . Units

D. 160 sq . Units

Answer: B

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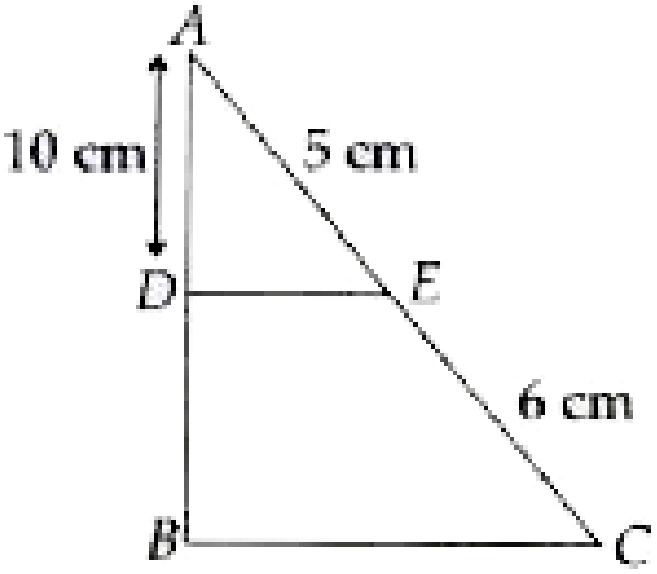
9. In the given figure , the value of AB will be



A. 11 cm

B. 12 cm

C. 22 cm

D. 16 cm

Answer: C

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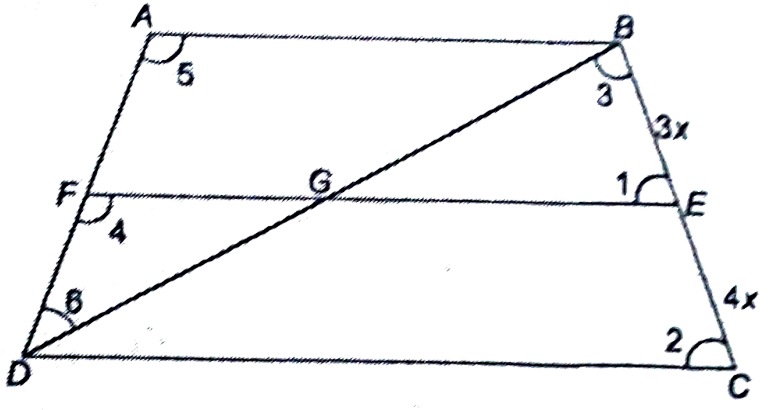
10. In trapezium ABCD. AB||DC and DC = 2AB. A line segment EF drawn parallel to AB cuts AD in F and BC in E such that $\frac{BE}{EC} = \frac{3}{4}$.

Diagonal DB intersects EF at G. prove that &EF= 10AB.



A. 7

B. 9

C. 10

D. 11

Answer: D

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11. In Fig. 4.220, D is the mid-point of side BC and $AE \perp BC$. If $BC = a$, $AC = b$, $AB = c$, $ED = x$, $AD = p$ and $AE = p$ and $AE = h$, prove that: (FIGURE) $b^2 = p^2 + ax + \frac{a^2}{4}$ (ii) $c^2 = p^2 - ax + \frac{a^2}{4}$ (iii) $b^2 + c^2 = 2\,p^2 + \frac{a^2}{2}$

A.

P	Q	R
a^2x	$a^2/2$	$2p^2$

B.

P	Q	R
ax	$a^4/2$	$4p^2$

C.

P	Q	R
ax	$a^4/2$	$2p^2$

D.

P	Q	R
a^2x	$a^2/2$	$2p$

Answer: C

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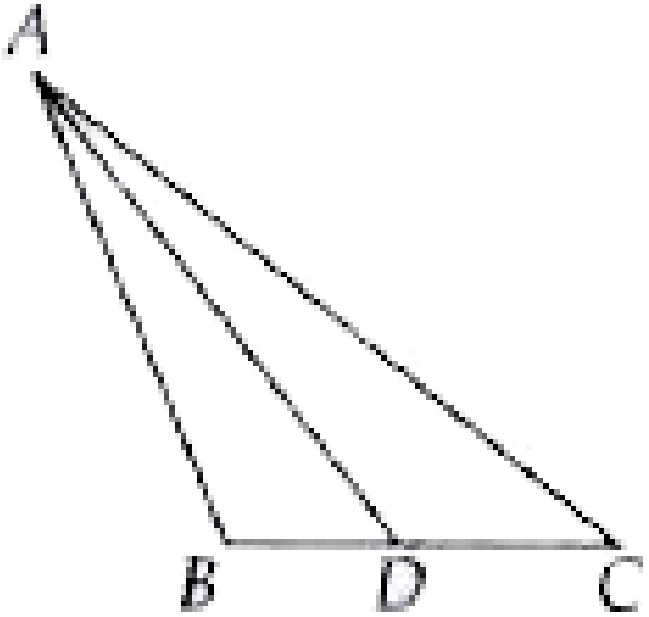
12. In the given figure , if AD is the bisector of $\angle BAC$. If AB=10 cm , AC = 14 cm and BC = 6 cm , then find BD and DC .



A. 2.5 cm , 3.5 cm

B. 3 cm , 3 cm

C. 3.5 cm , 4.5 cm

D. 4 cm , 2 cm

Answer: A

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13. Read the statemenst carefully and state 'T' for true and 'F' for false .

1. If a line divides any two sides of a triangle in the same ratio , then the line is parallel to the third side of the triangle .

2 . The internal bisector of an angle of a triangle divides the opposite side inernally in the ratio of the sides containing the angle .

3 . If a line through one vertex of a triangle divides the opposite in the ratio of other two sides , then the line bisects the angle at the vertex .

4.Any line parallel to the parallel sides dividesproportionally .

5. Two times the sum of the squares of the sides of a triangle is equal to four times the sum of the squares of the medians of the triangle .

A. $\begin{matrix}1 & 2 & 3 & 4 & 5\\ T & T & T & T & T\end{matrix}$

B. $\begin{matrix}1 & 2 & 3 & 4 & 5\\ T & T & T & T & F\end{matrix}$

C. $\begin{matrix}1 & 2 & 3 & 4 & 5\\ F & T & F & T & F\end{matrix}$

D. $\begin{matrix}1 & 2 & 3 & 4 & 5\\ T & T & F & T & F\end{matrix}$

Answer: B

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14. Fill in the blanks .

(i) In two similar triangles , ABC and PQR , if their corresponding altitudes AD and PS are in the ratio 4 : 9 , then $ar(\Delta ABC) : ar(\Delta PQR) = \overline{(P)}$.

(ii) Area of an equilateral triangle described on the side of a square is $\overline{(O)}$ the area of equilateral triangle described on its diagonal .

(iii) The altitude of an equilateral triangle with side 'a' equals oberline((R))`

A. $\begin{matrix}P & Q & R\\ 16:81 & \text{Twice} & \frac{a}{2}\end{matrix}$

B.

P	Q	R
$4:9$	Half	$2a$

C.

P	Q	R
$16:81$	Half	$\frac{\sqrt{3a}}{2}$

D.

P	Q	R
$4:9$	Twice	$\frac{\sqrt{3a}}{2}$

Answer: C

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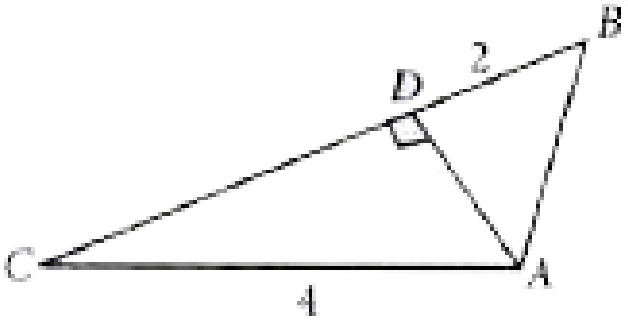
15. In the given figure , if $AD \perp BC, AC = 4, BD = 2, AB = a$ and $CD = b$, then $a^2 + b^2 =$



A. 6

B. 8

C. 12

D. 20

Answer: D

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