MATHS

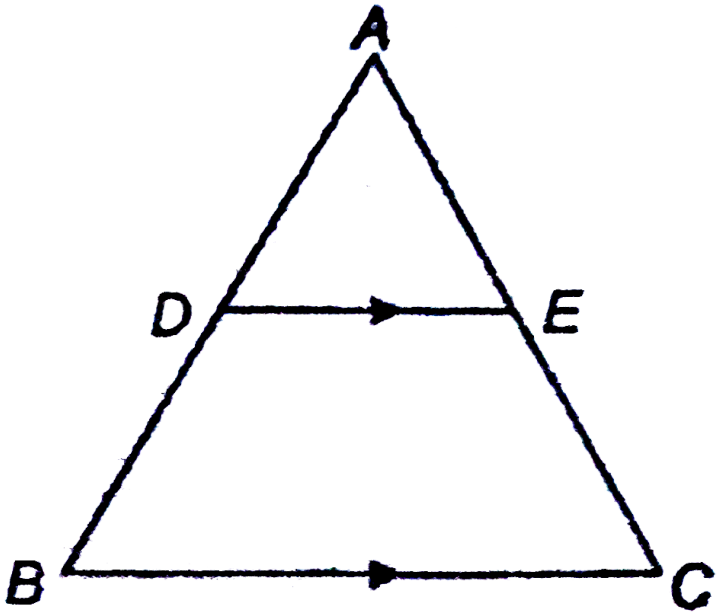
BOOKS - NAGEEN PRAKASHAN ENGLISH

TRIANGLES

Solved Example

1. In the adjoining figure DE||BC and D divides AB in the ratio 2:3 find.

(i) $\frac{AE}{EC}$ (ii) $\frac{AE}{AC}$



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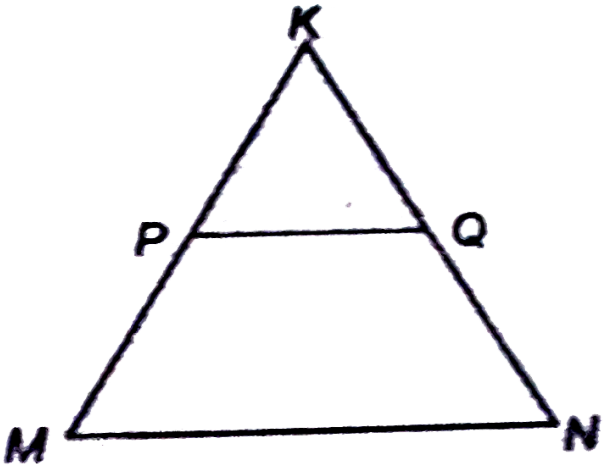
2. In the figure PQ is parallel to MN if $\frac{KP}{PM} = \frac{4}{13}$ and $KN = 20.4$.

Find KQ.



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3. if D and E are points on the sides AB and AC of a ΔABC. Such that AB=12 cm, AD=8 cm, AE=12 cm, AC= 18 cm. show that DE||BC.

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4. In the given figure, in ΔABC, $DE \mid\mid BC$ so that AD= (4x - 3) cm, AE= (8x-7) cm, BD= (3x-1) cm and CE= (5x-3) cm . Find the value of x.

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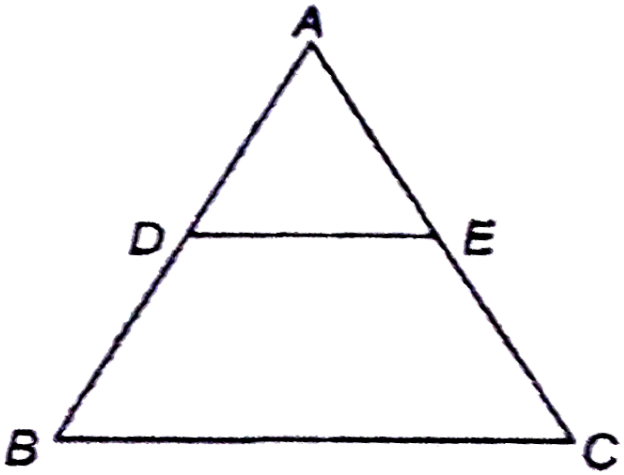
5. In ΔABC, D and E are points on the sides AB and AC respectively. Find whether DE||BC if

(i) AD= 3cm , BD = 4.5cm, AE = 4cm, AC= 10cm

(ii) AB=7 cm , BD = 4.5cm, AE = 3.5 cm, CE= 5.6cm.



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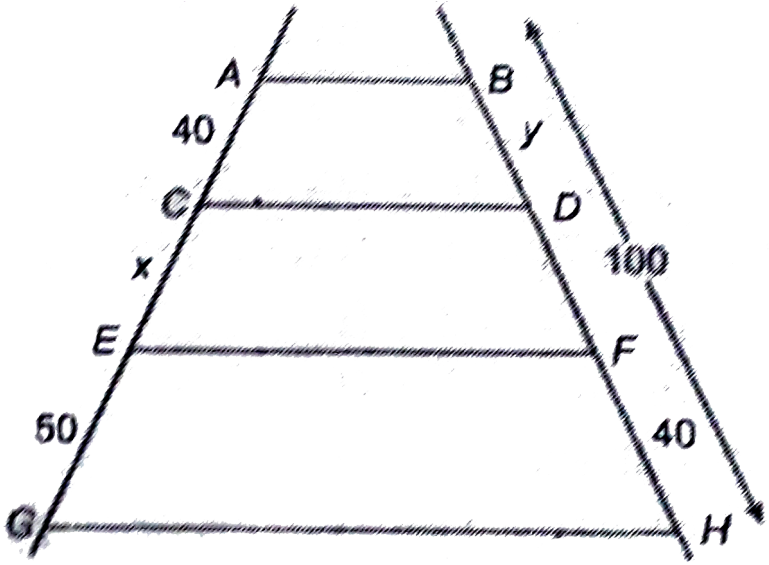
6. In the following figure AB||CD||EF||GH and BH=100 cm. find x and y.



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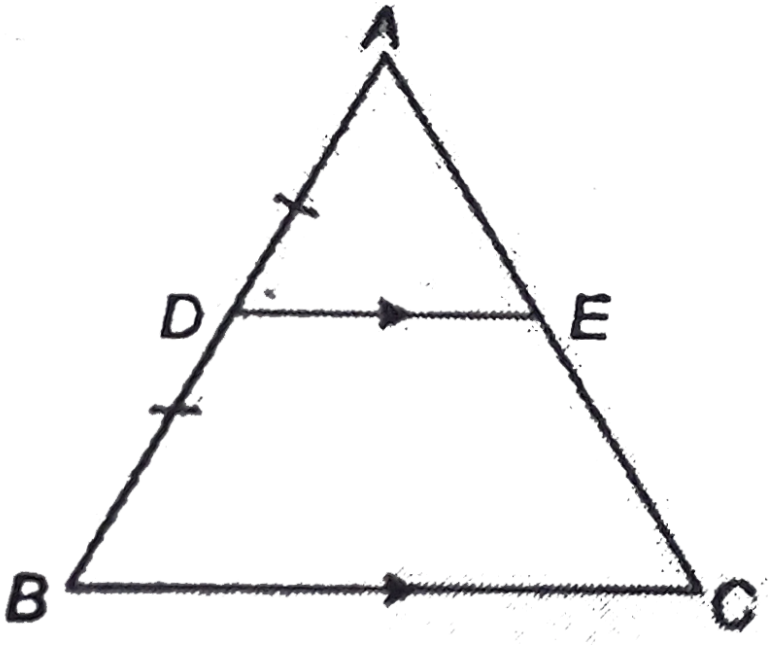
7. Prove using similar triangles, that a line drawn through the mid-point of one side of a triangle parallel to another side, bisects the third side.



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8. Prove that the line joining the mid-points of the two sides of a triangle is parallel to the third side.

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9. The external angle bisector of an angle of a triangle divides the opposite side externally in the ratio of the sides containing the angle.

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10. ABCD is a trapezium such that AB||CD. Its diagonals AC and BC intersect each other at O. Prove that $\frac{AO}{OC} = \frac{BO}{OD}$

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

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12. The side BC of a triangle ABC is bisected at D; O is any point in AD. BO and CO produced meet AC and AB in E and F

respectively and AD is produced to X so that D is the mid-point of OX.

Prove that $AO: AX = AF: AB$ and show that $FE \| \| BC$.

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13. Let ABC be a triangle and D and E be two points on side AB such that $AD = BE$. If $DP \| \| BC$ and $EQ \| \| AC$, Then prove that $PQ \| \| AB$.

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14. In figure, $DE||AB$ and $BD||BEF$. Prove that $DC^2 = CF \times AC$

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15. In the given figure $\triangle ACB \sim \triangle APQ$. If BC= 8cm , PQ = 4cm BA= 6.5 cm, AP = 2.8 cm, find CA and AQ.

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16. The triangles shown in adjoining figures are similar. Find the values of a and b.

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17. In the given figure if DE||BC, find the value of x.

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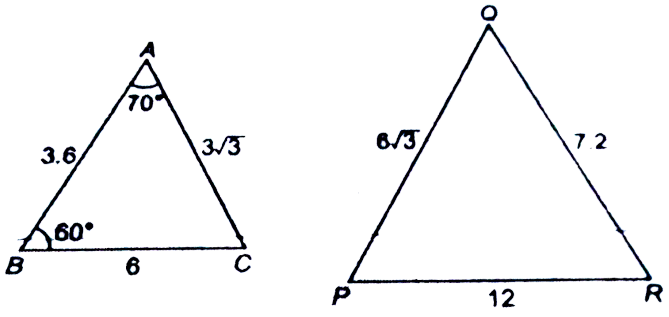
18. Find $\angle P$ in the figure below.



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19. In the figure AC||BD , prove that:

$(i) \triangle ACE \sim \triangle BDE (ii) \frac{AE}{CE} = \frac{BE}{DE}$

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20. 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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21. ABC is an isosceles triangle with $AB = AC$ and D is a point on AC such that $BC^2 = ACxCD$. Prove that $BD = BC$

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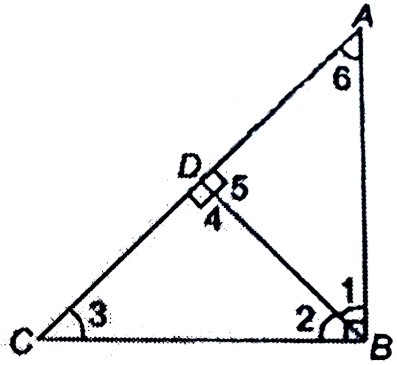
22. In the given figure if $\angle B = 90^\circ$ and BD is perpendicular to AC then prove that:

$(i) \triangle ADB \sim \triangle BDC (ii) \triangle ADB \sim \triangle ABC$

(iii) $\triangle BDC \sim \triangle ABC (iv) BD^2 = AD \times DC$

(v) $AB^2 = AD \times AC (vi) BC^2 = CD \times AC$

(vii) $AB^2 + BC^2 = AC^2$



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23. In the given figure , DEFG is a square and $\angle BAC = 90^\circ$ prove that

(i) $\triangle AGF \sim \triangle DBG \, (ii) \triangle AGF \sim \triangle EFC$

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24. In the adjoining figure if a= 18 , b= 12,c = 14 and d=8 , what is the measure of x?

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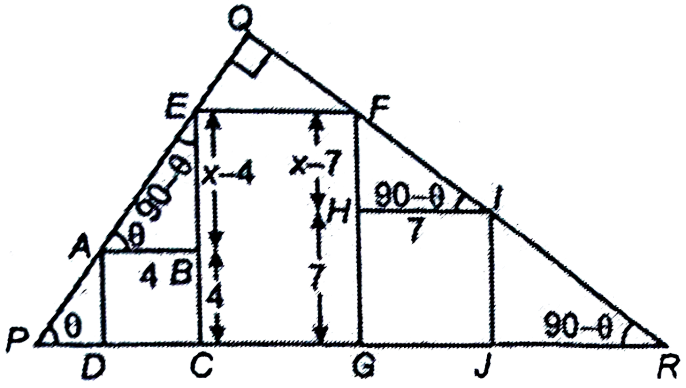
25. In the adjoining frigure , $\triangle PQR$ is a right angled triangle in which $\angle PQR = 90^\circ$, $squre ABCD$ is a square of side 4 units and $squre GHIJ$ is a square of side 7 units. EC and CG are the length and breadth of rectangle CEFG. Find the length EC.



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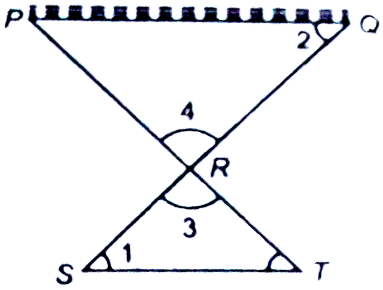
26. Dr. Bansal needs to determine the distance PQ across a river in and east-west direction as shown in the adjoining figure. He can't measure this distance directly over the water. So, he selects the point S from where a straight line to point Q stays on land so he can mesure distance. he then moves eastward a distance of 400 m from point S to T , so that the line of sight from point T to P cuts the previous line SQ at R. finally with a long measuring tape. he determines that. SR = 250 m, QR= 1250 m Determine if this is enough information to calculate the distance PQ and if so, find PQ and hence find the time taken by a swimmer to cross the river PQ with a uniform speed of 800 m/hr.



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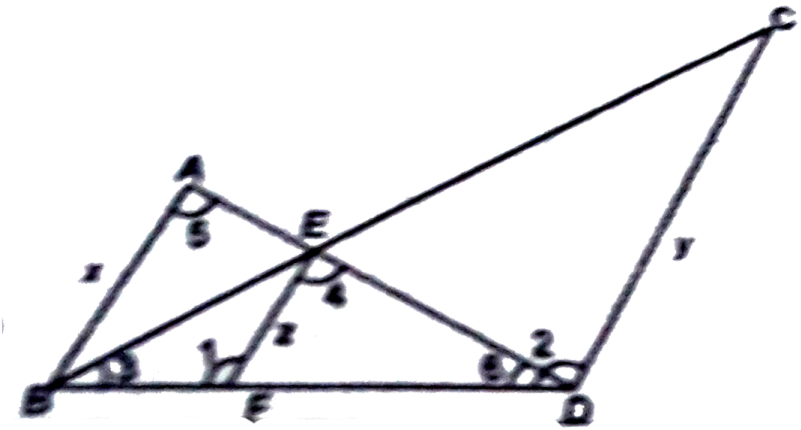
27. In the adjoining figure , AB||CD||EF.

prove that $\frac{1}{x}+\frac{1}{y}=\frac{1}{z}$.



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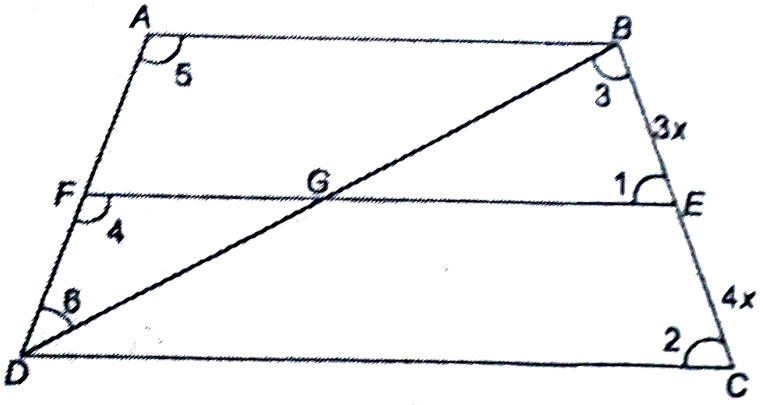
28. In trapezium ABCD. AB||DC and DC = 2AB. A line segment EF drawn parallel to AB cuts AD in F and BC in E such that $\frac{BE}{EC}=\frac{3}{4}$.

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



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29. Through the mid-point M of the side CD of a parallelogram $ABCD$, the line BM is drawn intersecting AC at $LandAD$ produced at E . Prove that $EL = 2BL$.

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30. Two sides and a median bisecting the third side are respectively proportional to the two sides and corresponding median of other

triangle. Prove that the triangle are similar.

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31. If two sides and a median bisecting the third side of a triangle ar respectively proportional to the corresponding sides and median of the other triangle; then the two triangles are similar.

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32. The perimeters of two similar triangles are 25cm and 15cm respectively. If one side of first triangle is 9cm, what is the corresponding side of the other triangle?

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33. A lamp is 3.3 m be the lamp post and CD= 110 cm tall walks away from the base of this lamp post at a speed of 0.8 m/s. find the length of the

shadow of boy after 4 seconds.

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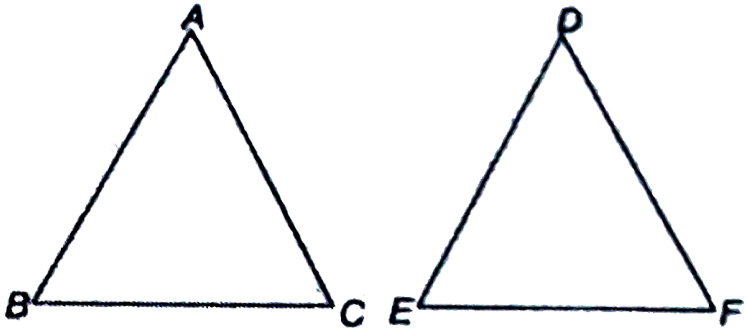
34. In figures $\triangle ABC$ and $\triangle DEF$ ar similar , the areas of $\triangle ABC$ is 9 sq. m and that of $\triangle DEF$ is 16 sq. cm. if EF= 4.2 cm, find BC.



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35. If D, E, F are the mid-points of the sides $BC, CA and AB$ respectively of a triangle ABC, prove by vector method that $Area of DEF = \frac{1}{4}(area of ABC)$.

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36. 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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37. In Fig. 4.170, $ABCD$ is a trapezium in which $AB \parallel DC$ and $AB = 2\,DC$. Determine the ratio of the areas of AOB and COD . (FIGURE)

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38. In the trapezium $ABCD, ABCDandAB = 2CD\cdot$ If the area of $AOB = 84cm^2,$ find the area of $COD\cdot$

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39. In figure, DE||BC and the ratio of the areas of $\triangle ADE$and trapezium BDEC is 4:5 . Find the ratio of DE:BC . If BD = 2cm. Then find AD.

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40. X and Y are points on the sides AB and BC respectively of $\triangle ABC$ such that XY||AC and XY divides $\triangle ABC$ into two parts in area , find $\frac{AX}{AB}$

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41. CE and DE are equal chords of a cricule with centre O. if $\angle AOB = 90^\circ$ find $ar(\triangle CED) : ar(\triangle AOB)$

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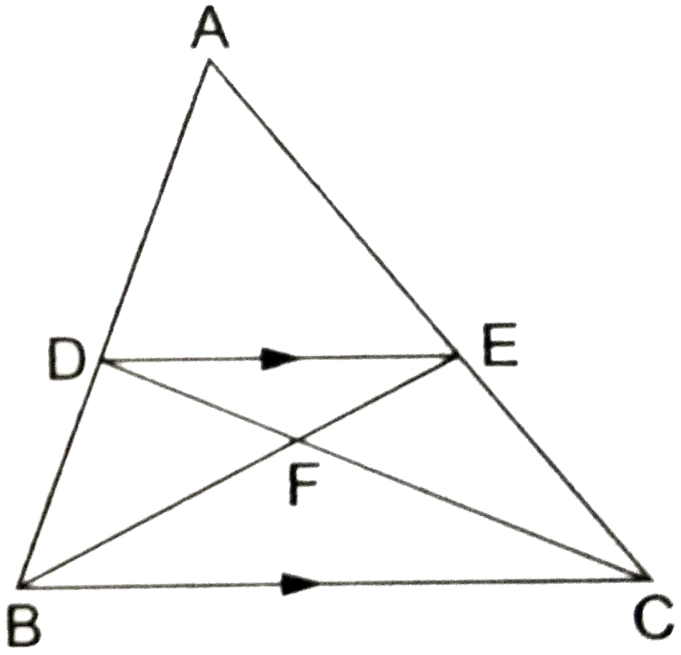
42. In the given figure $DE \| BC$ and $AD:DB = 5:4$

Find the ratio $ar(\Delta DEF):ar(\Delta CFB)$



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43. If two triangles are similar; prove that the ratio of corresponding area is equal to the ratio of squares corresponding altitudes.

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44. 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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45. If two triangles are similar; prove that the ratio of the corresponding sides is same as the corresponding angle bisector segments.

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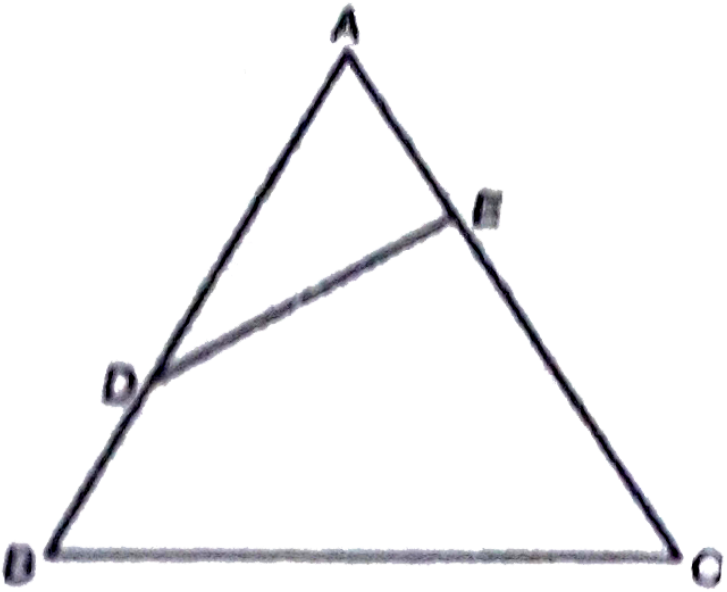
46. In the adjoining figure ADE and ABC are two similar triangles, point D divides AB in the raito 2:1 and point E divides AC in the ratio 1:2 . If the

area of $\triangle ADE$ is 23 square units, then find the ar($\square DECB$).



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47. The sides of a triangle are 5 cm, 8 cm and 11 cm respectively. Demtermine whether it is a right angled triangle or not.

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48. A ladder, 25 m long reaches a window of building 20 m, above the ground. The distance of the foot of the ladder from the building.

A. 45 m

B. 5 m

C. 10 m

D. 15 m

Answer: D

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49. Two poles of height 6 meters and 11 meteras stand vertically on a plane ground. If the distance between their feet is 12 meters. Find the distance between their tops.

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50. P and Q are the mid-points of the sides CA and CB respectively of a $\triangle ABC$, right angled at C, prove that.

(i) $4AQ^2 = 4AC^2 + BC^2$ (ii) $4BP^2 = 4BC^2 + AC^2$ (iii) $4(AQ^2 + BP^2)5AB^2$

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51. The perpendicular AD on the base BC of a triangle ABC intersects BC at D so that $DB = 3CD$. Prove that $2\,AB^2 = 2\,AC^2 + BC^2$.

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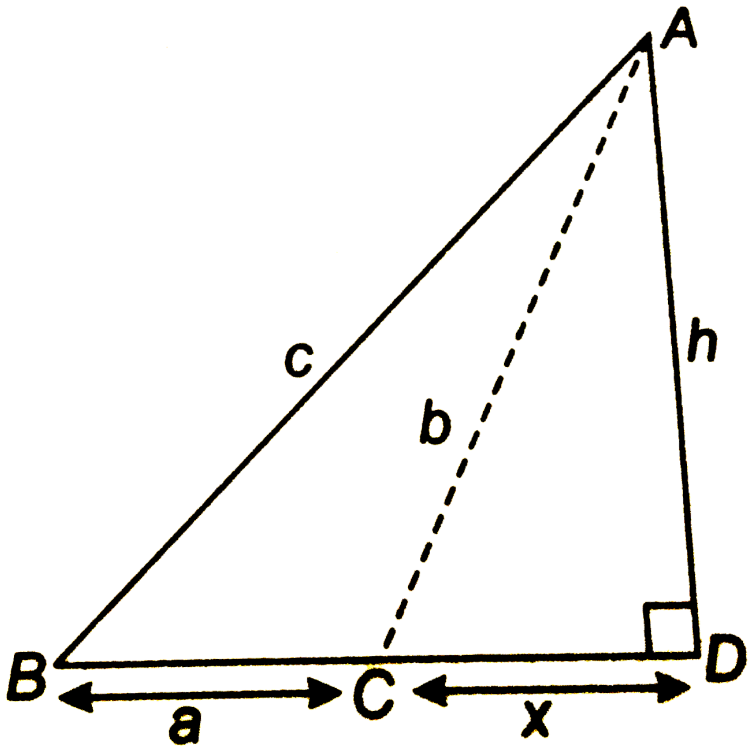
52. In the given figure AD is perpendicular to BC produced, prove that :

$c^2 = a^2 + b^2 + 2ax$



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53. ABC is a right traingle, right angled at C. if P is the length of perpendicular from C to AB and AB=c, BC=a and CA=b, then prove that (i) pc=ab (ii) $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$

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54. 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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55. In an equilateral triangle ABC the side BC is trisected at D. Prove that $9\,AD^2 = 7\,AB^2$

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

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57. In a triangle ABC, $AC > AB$, D is the mid-point of BC and $AE \perp BC$. Prove that: (i) $AB^2 = AD^2 - BC.\,DE + \frac{1}{4}BC^2$ (ii) $AB^2 + AC^2 = 2\,AD^2 + \frac{1}{2}BC^2$

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58. In PQR, $QM \perp PR$ and $PR^2 - PQ^2 = QR^2$. Prove that $QM^2 = PM \times MR$

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59. prove by vector method that the sum of the squares of the diagonals of a parallelogram is equal to the sum of the squares of its sides.

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60. 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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61. In Figure, ABC is a right triangle right angled at B and points $DandE$ trisect BC. Prove that $8AE^2 = 3AC^2 + 5AD^2$.

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62. In a triangle ABC, the angles at B and C are acute. If BE and CF be drawn perpendiculars on AC and AB respectively, prove that $BC^2 = AB \cdot BF + AC \cdot CE$.

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63. 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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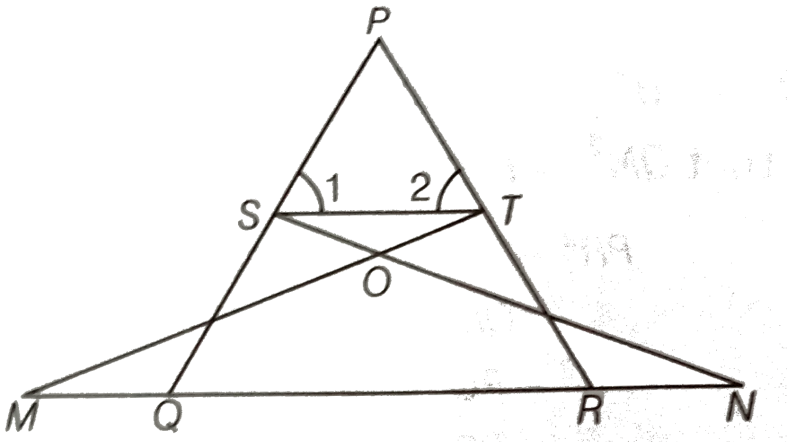
Problems From Ncert Exemplar

1. In figure, if $\angle 1 = \angle 2$ and $\Delta NSQ = \Delta MTR$, then prove that $\Delta PTS \sim \Delta PRQ$.



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

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3. 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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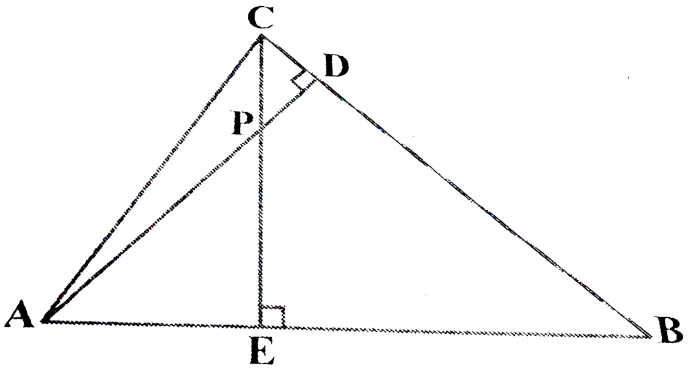
4. In Figure altitudes AD and CE of A B C intersect each other at the point P. Show that:(i) $\Delta AEP \sim \Delta CDP$ (ii) $\Delta ABD \sim \Delta CBE$ (iii) $\Delta AEP \sim \Delta ADB$(iv) $\Delta PDC \sim \Delta BEC$



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5. ABCD is a trapezium in which AB||DC and P,Q are points on AD and BC respectively, such that PQ||DC, if PD=18 cm, BQ=35 cm and QC=15 cm. Find AD.

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6. In figure 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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7. Ii ΔPQR, PD $\perp$ QR such that D lies on QR, if PQ=a,PR=b,QD=c and DR=d, then prove that (a+b)(a-b)=(c+d)(c-d).

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8. In a ΔPQR, N is a point on PR, such that QN $\perp$ PR. If PN $\cdot$ NR=QN^2, then prove that $\angle PQR = 90^\circ$.

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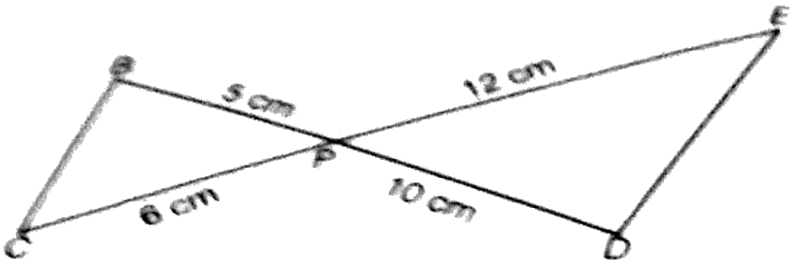
9. In figure BD and CE intersect each other at the point P. Is $\Delta PBC \sim \Delta PDE$? Why?



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10. If in two right triangles, one of the acute angles of one triangle is equal to an acute angle of the other triangle. Can you say that two triangles will be similar? Why?

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11. In PQR, $QM \perp PR$ and $PR^2 - PQ^2 = QR^2$. Prove that $QM^2 = PM \times MR$

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12. Diagonals of a trapezium PQRS intersect each other at the point 0 ,PQ ||RS and PQ=3 RS. Find the ratio of the areas of ΔPOQ and ΔROS.

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13. A 5 m long ladder is placed leaning towards a vertical wall such that it reaches the wall such that it reaches the wall at a point 4 m high. If the foot of the ladder is moved 1.6 m towards the wall, then find the distance by which the top of the ladder would slide upwards on teh wall.

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14. 14 In Fig. 6.21, PA, QB Rc and SD are all perpendiculars to a line l, AB 6 cm, Bc 9 cm, CD 12 cm and SP 36 cm Find PO, QR an RS. Fig. 6.21

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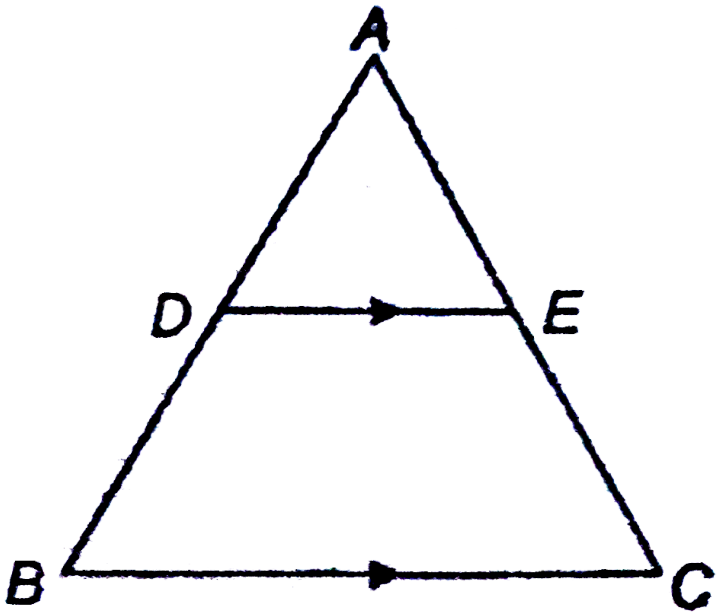
Exercise 6 A

1. In the adjoining figure DE||BC and D divides AB in the ratio 2:3 find.

$\frac{AE}{EC}$



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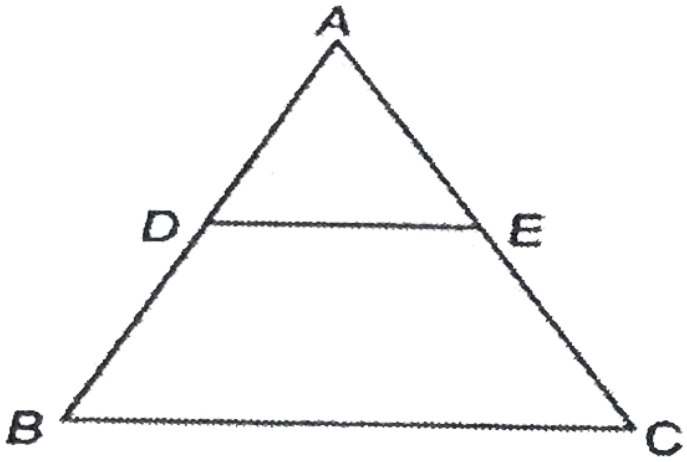
2. In the figure DE is parallel to BC and $\frac{AD}{DB} = \frac{2}{3}$ if AE = 3.7 cm find EC.



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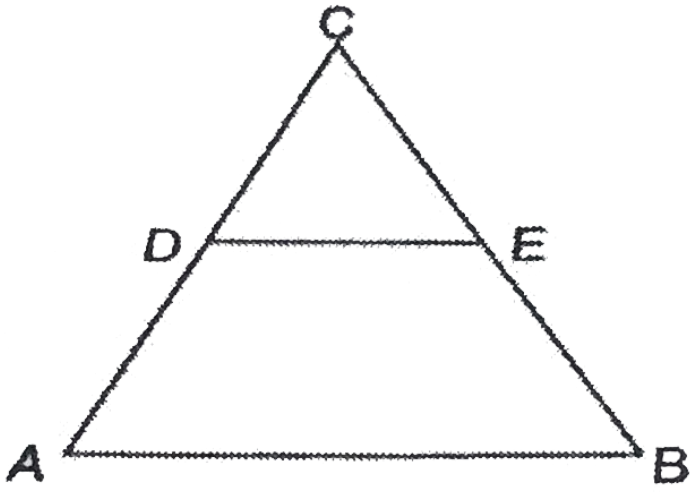
3. In the figure if DE||AB, find the value of x . Given AD= (x-4).

DC= 4cm, EB= (3x-19) cm and EC= (x-3) cm.



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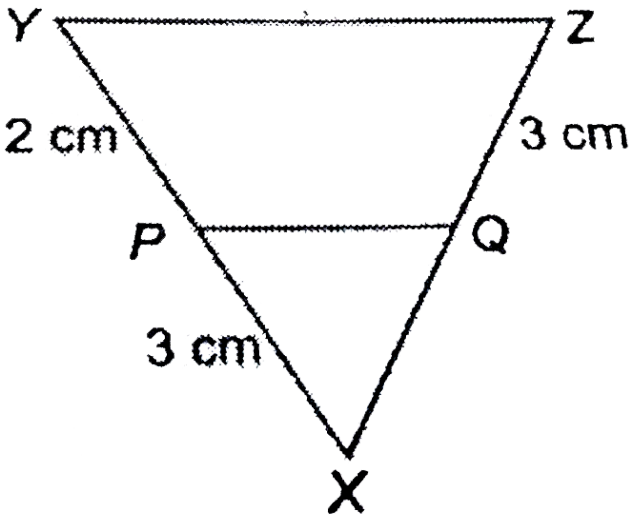
4. In the given figure if PQ||YZ. Find XQ.



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5. $DandE$ are respectively the points on the side $ABandAC$ of a ABC such that $AB = 5.6cm, AD = 1.4cm, AC = 7.2cm$ and $AE = 1.8cm,$ show that $DE \| BC$.

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6. In a ABC , D and E are points on the sides AB and AC respectively such that $DE \| BC$ If $AD = 6\,cm$, $DB = 9\,cm$ and $AE = 8\,cm$, find AC .

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7. In Fig. if $PQ \| BC$ and $PR \| CD$. Prove that (i) $\frac{AR}{AD} = \frac{AQ}{AB}$ (ii) $\frac{QB}{AQ} = \frac{DR}{AR}$.

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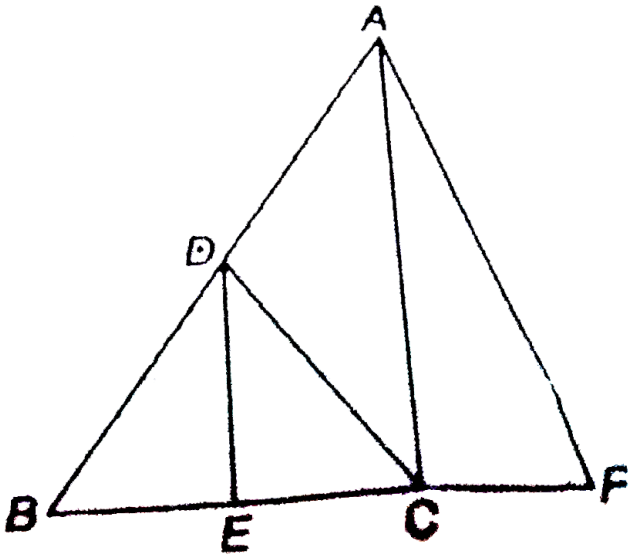
8. In the given figure DE||AC and DC||AP. Prove that $\frac{BE}{EC} = \frac{BC}{CP}$



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

A.

B.

C.

D.

Answer: N/A

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10. In ABC, D and E are points on sides AB and AC respectively such that $AD \times EC = AE \times DB$. Prove that $DEBC$.

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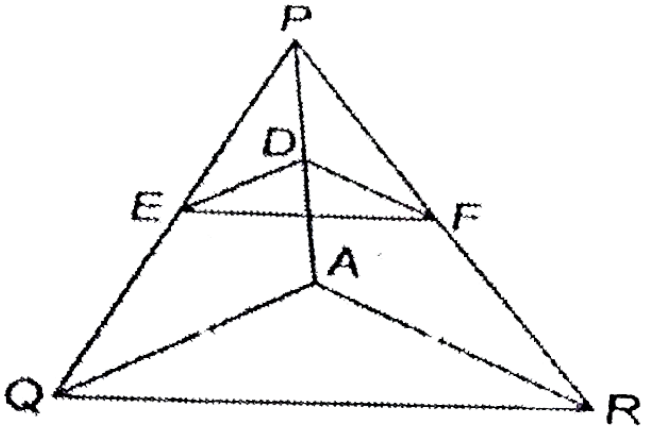
11. In the given figure, if DE||AQ and DF||AR. Prove that EF||QR.



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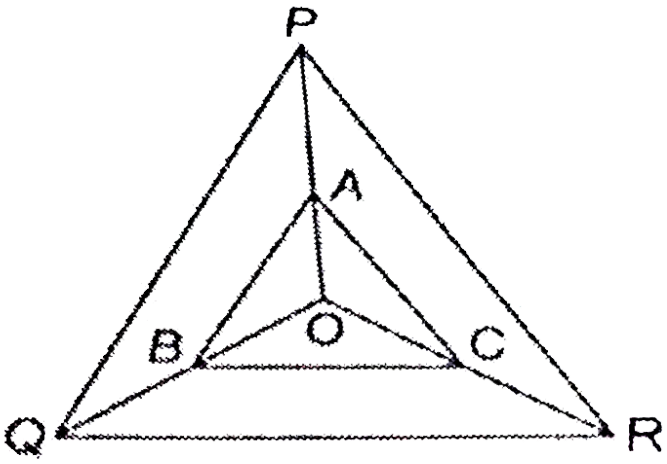
12. In the given figure A, B and C are points on OP, OQ and OR respectively such that AB||PQ and BC||QR. Show that AC||PR.



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13. Prove that the diagonals of a trapezium divide each other proportionally.

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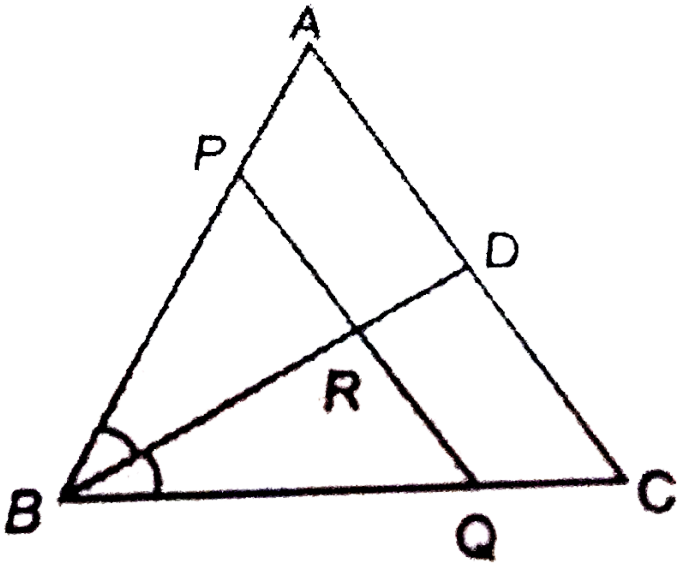
14. In $\triangle ABC$ the bisector of $\angle B$ meets AC at D. A line PQ||AC meets AB,BC and BD at P, Q and R respectively.

show that $PR \times BQ = QR \times BP$.



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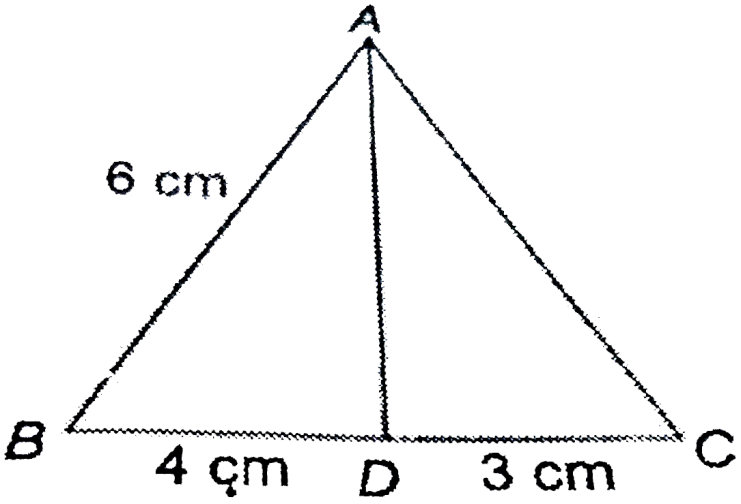
15. The diagonals of a quadrilateral ABCD intersect each other at the point O such that $\frac{AO}{BO} = \frac{CO}{DO}$. Show that ABCD is a trapezium.

Watch Video Solution

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



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17. The bisector of interior $\angle A$ of ABC meets BC in D, and the bisector of exterior $\angle A$ meets BC produced in E. Prove that $\frac{BD}{BE} = \frac{CD}{CE}$.

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18. AD is a median of ABC . The bisector of $\angle ADB$ and $\angle ADC$ meet $ABandAC$ in $EandF$ respectively. Prove that $EFBC$.

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19. If the bisector of an angle of a triangle bisects the opposite side, prove that the triangle is isosceles.

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20. $D,\ E$ and F are the points on sides $BC,\ CA$ and AB respectively of ABC such that AD bisects $\angle A,\ \ BE$ bisects $\angle B$ and CF bisects $\angle C$. If $AB = 5cm,\ \ BC = 8cm$ and $CA = 4cm$, determine $AF,\ CE$ and BD .

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

Watch Video Solution

22. Prove that the line segments joints joining the mid-points of the adjacent sides of a quadrilateral from a parallelogram.

Watch Video Solution

23. In figure, P is the mid-point of BC, Q is the mid-point of BC, Q is the mid-point of AP, such that BQ produced meets AC at R.

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24. In Figure, $ABCD$ is a parallelogram in which P is the mid-point of DC and Q is a point on AC such that $CQ = \frac{1}{4}AC$. If PQ produced

meets BC at R. Prove that R is a mid-point of BC.

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Eercise 6 B

1. In the given figure , AB||CD . Prove that $\triangle AOB \sim \triangle DOC$.

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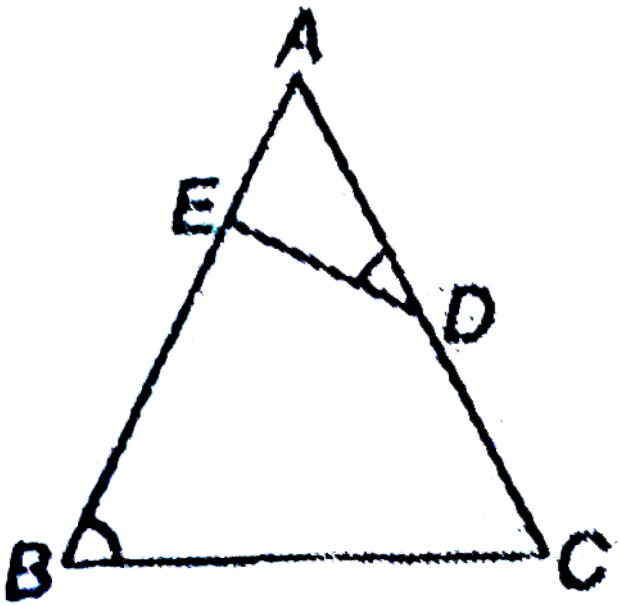
Exercise 6 B

1. In the given figure, if $\angle ADE = \angle B$ show that $\triangle ADE \sim \triangle ABC$.



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2. 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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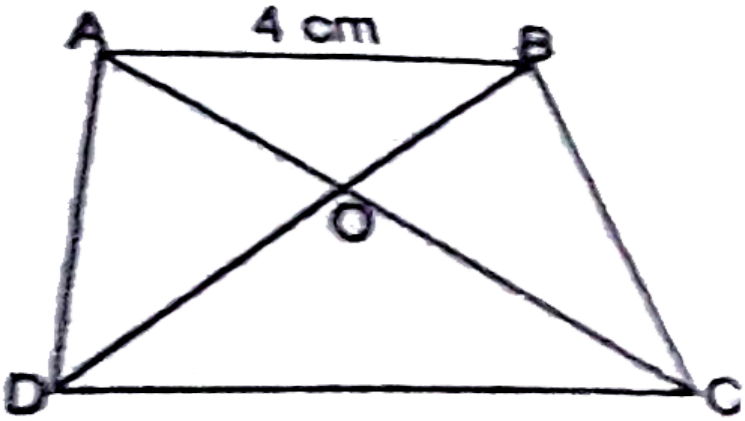
3. In the adjoining figure , $\frac{AO}{OC} = \frac{BO}{OD} = \frac{1}{2}$ and AB = 4cm find the value of CD.



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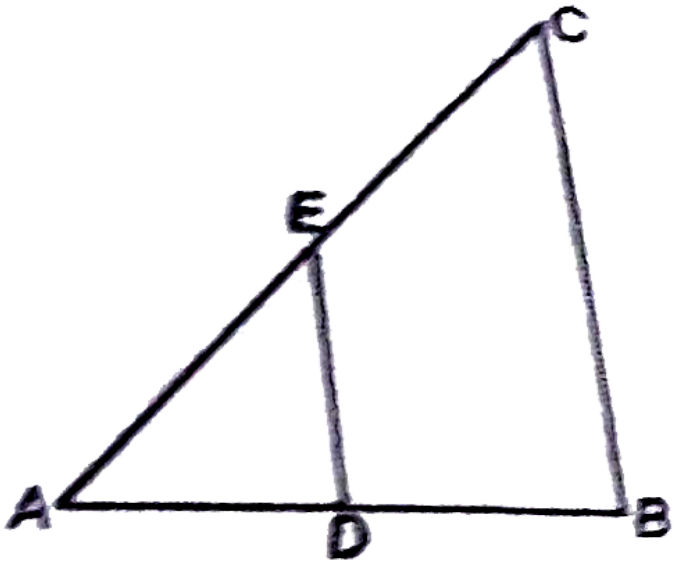
4. In the figure $\triangle ABC \sim \triangle AED$. If AD=5 cm , AE= 6 cm, BC= 12 cm and AB = 15 cm. Determine AC and DE.



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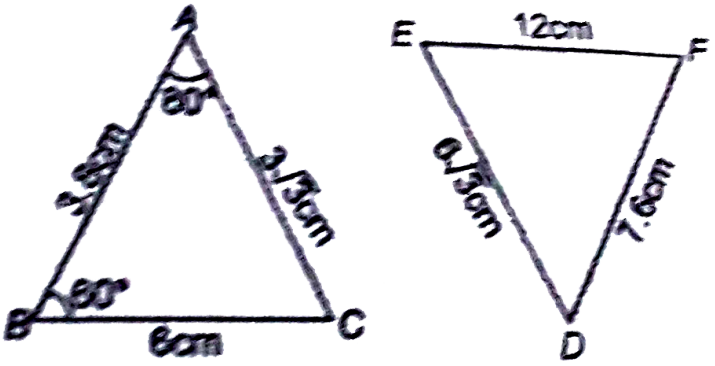
5. in the adjoining figure find $\angle F$.



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6. A vertical stick 12m long casts a shadow 8m long on the ground. At the same time a tower casts the shadow 40m long onthe ground. Determine the height of the tower.

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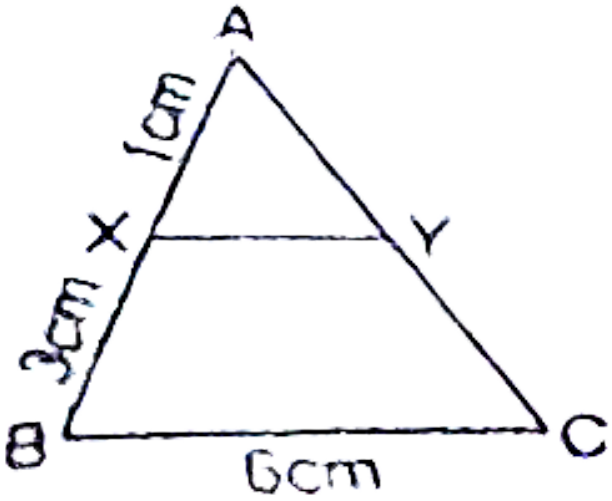
7. In the given figure , if XY||BC, find the length of XY.



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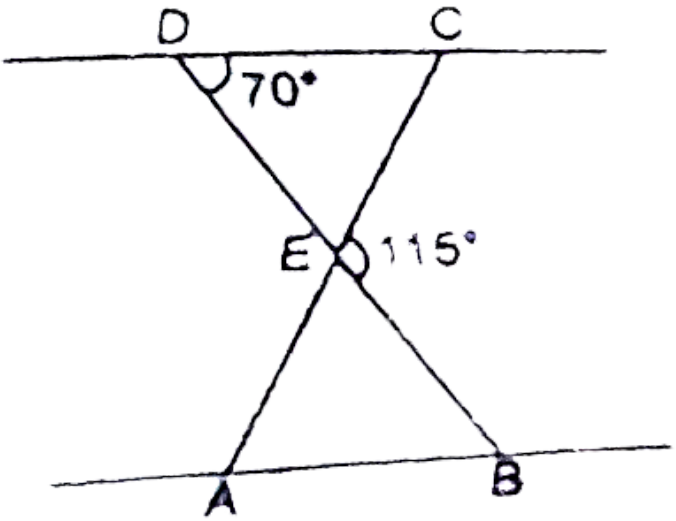
8. In the given figure if `triangleEDC~triangleEBA, ∠BEC = 115^∘ and ∠EDC= 70^∘ "Find" ∠DEC, ∠AEB,



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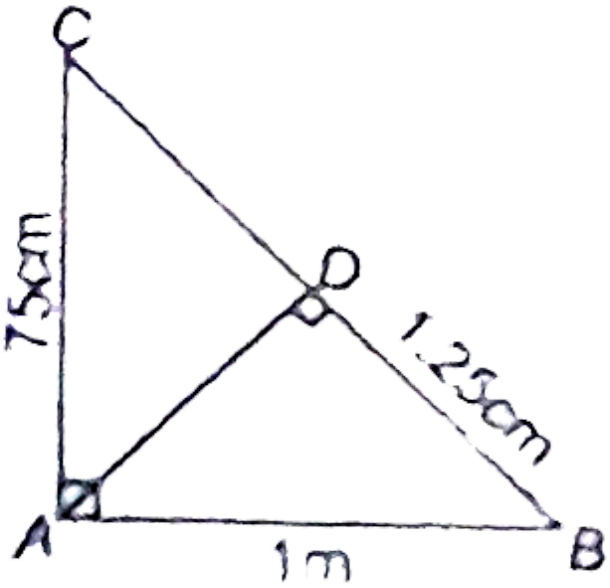
9. in the given figure $\angle CAB = 90^\circ$ and $AD \perp BC$. if AC= 75 cm , AB= 1m and BD= 1.25 m . Find AD.



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10. the perimeters of two similar triangles are 40 cm and 30 cm respectively. If one side of the first traingle is 21 cm. Determine the corresponding side of the second triangle.

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11. In the given figure AD and CE are two altitude of $\triangle ABC$. Prove that.

$\triangle AEF \sim \triangle CDF$

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

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13. The diagonal BD of a parallelogram $ABCD$ intersects the segment AE at the point F, where E is any point on the side BC . Prove that $DF \cdot EF = FB \cdot FA$.

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14. 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.

Watch Video Solution

15. Two triangles $BACandBDC$, right angled at $AandD$ respectively, are drawn on the same base BC and on the same side of BC . If AC and DB intersect at P, prove that $APxPC = DPxPB$.

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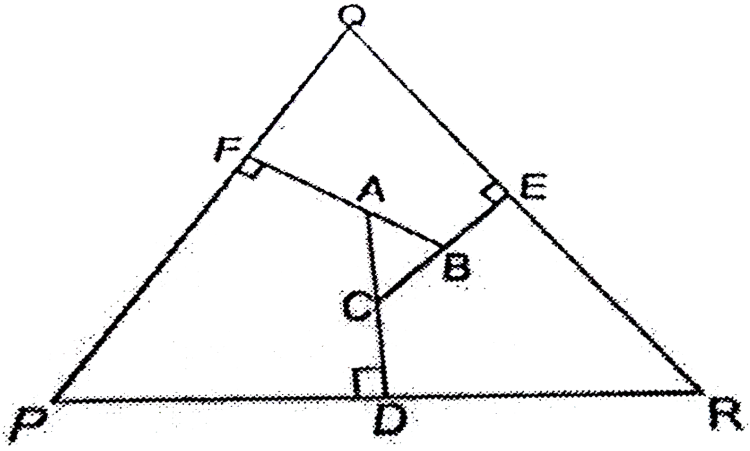
16. In a triangle ABC , let P and Q be points on AB and AC respectively such that $PQ \| BC$. Prove that the median AD bisects PQ.

Watch Video Solution

17. from the adjoining figure, prove that $\triangle PQR \sim \triangle ABC$. Hence prove that $\frac{PR}{AC} = \sqrt{\frac{PQ}{AB} \cdot \frac{QR}{BC}}$.



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18. In Figure, AD and BE are respectively perpendiculars to BC and AC. Show that: $(i) \triangle ADC \sim \triangle BEC$ $(ii) CA \times CE = CB \times CD$ $(iii) \triangle ABC \sim \triangle DEC$ $(iv) CD \times AB = CA \times DE$

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19. In a $\triangle ABC$, $AD \perp BC$ and $AD^2 = BD \times CD$. Prove that ABC is a right triangle.

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20. If one diagonal of a trapezium divides the other diagonal in the ratio 1:2, prove that one of the parallel lines is double the other.

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21. 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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22. In the adjoining figure two medians AD and BE of a $\triangle ABC$ meet each other at O. prove that (i) $\triangle AOB \sim \triangle DOE$

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23. In an isosceles triangle ABC, the base AB is produced both the ways to P and Q respectively, such that $AP \times BQ = AC^2$. Prove that triangle APC is similar to triangle BCQ..

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24. 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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25. E si a point on side AD produced of a parallelogram ABCD and BE intersects DC at F. prove that $\triangle ABE \sim \triangle CFB$.

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26. In a right angled triangle with sides a and b and hypotenuse c , the altitude drawn on the hypotenuse is x . Prove that $ab = cx$.

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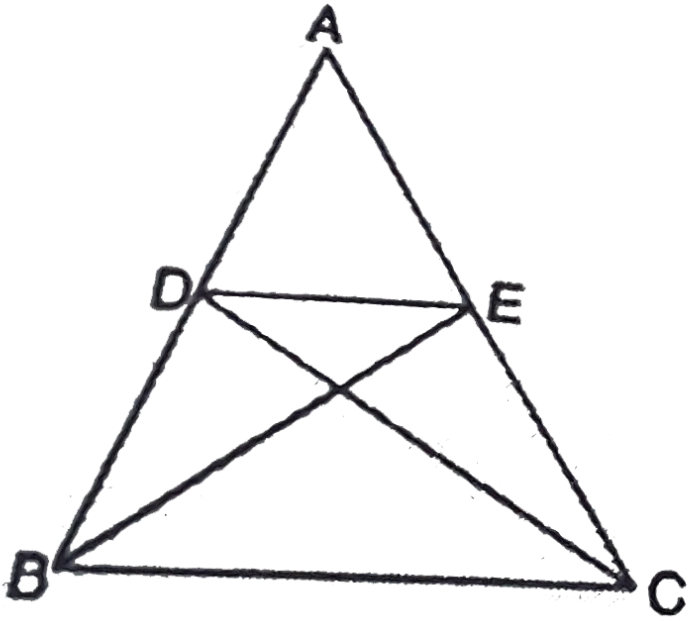
27. in the given figure, if $\triangle ABE \cong \triangle ACD$ prove that $\triangle ADE \sim \triangle ABC$.



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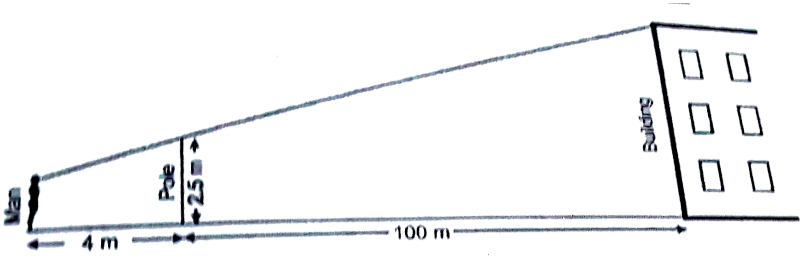
28. A man wishes to determine the height of a tall building . In the middle of the horizontal field next to the buliding, there is a sign post whose top measures to be 2.5 m above the ground. The man then backup from the post away from the building until the top of the post just lines up with the top of the building and marks the spot where his feet are. the man then measures the distances shown in the adjoining figure. if the eyes of a man standing on the ground are 1.4 m a bove the

ground, find the height of the building.



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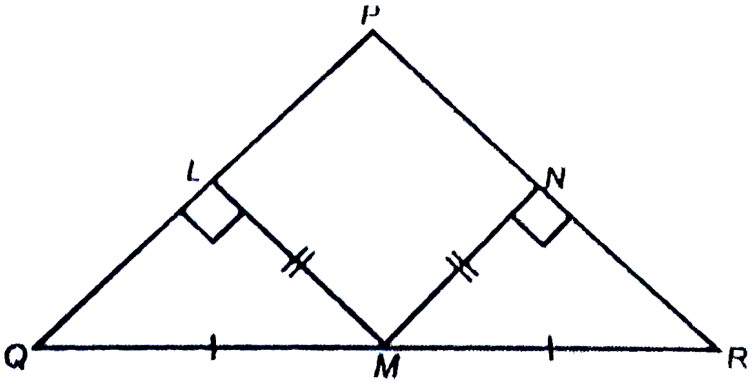
29. In $\triangle PQR, \angle P = 72^\circ$, M is the mid point of side QR, and L and N are the feet of perpendicular drawn from M to PQ and PR respectively . If LM=MN, then what is the measure of $\angle NMR$?



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Exercise 6 C

1. The areas of two similar $\triangle ABC$ and $\triangle PQR$ are 64 sq. cm and 121 sq. cm. repsectively. If QR= 15.4 cm, find BC.

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2. If $ABC \sim DEF$ such that $AB = 1.2cm$ and $DE = 1.4cm$. Find the ratio of areas of ABC and DEF.

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3. The areas of two similar triangle are $81cm^2$ and $49cm^2$ respectively. If the altitude of the bigger triangle is 4.5 cm, find th corresponding altitude of the smaller triangle.

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4. The areas of two similar triangle are $100cm^2$ and $64cm^2$ respectively. If a median of the smaller triangle is 5.6 cm, find th corresponding median of the other.

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5. Two isosceles triangles have equal vertical angles and their areas are in the ratio 9:16 . Find the ratio of their corresponding heights.

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6. In a trapezium PQRS, PQ||SR and PQ= 2 SR. if the diagonals intersect at O and area of $\triangle POQ = 96cm^2$, find the area of $\triangle SOR$.

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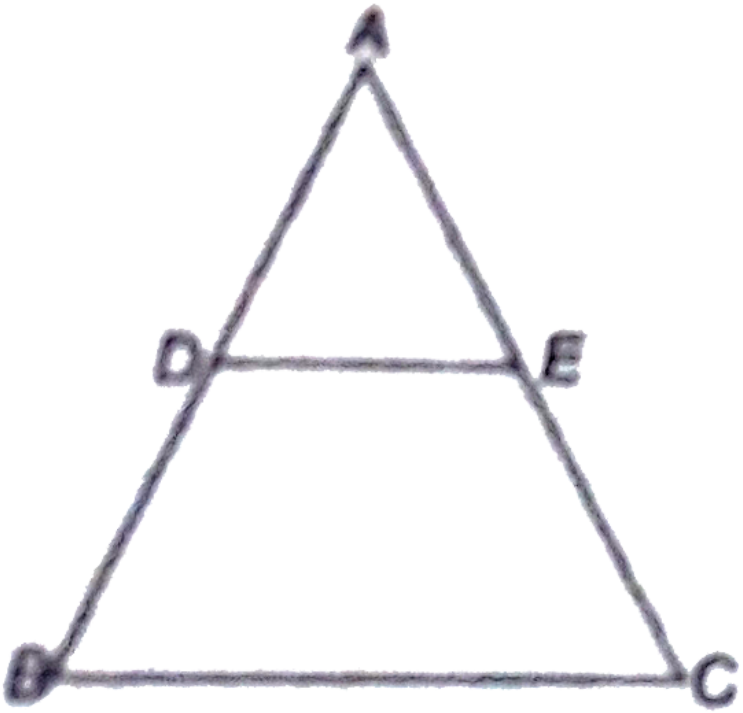
7. In the adjoining figure BC||DE. Area of $\triangle = 25cm^2$ .area of trapezium $BCED = 24cm^2$, DE= 14 cm, calculate length of BC.



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

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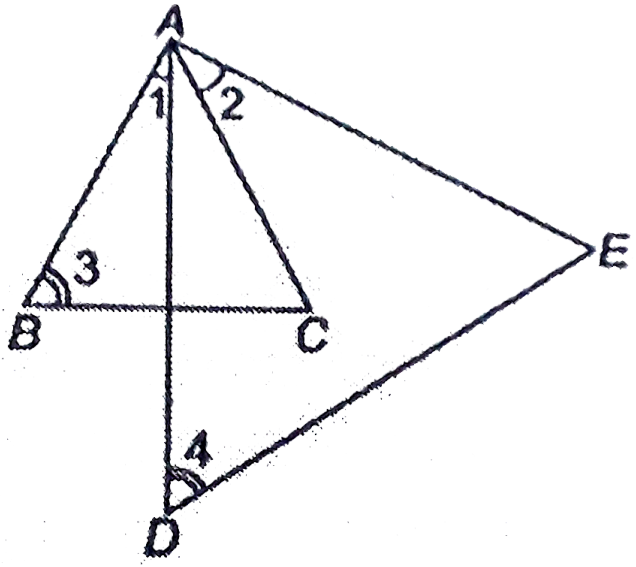
9. In the given figure , $\angle 1 = \angle 2$ and $\angle 3 = \angle 4$. If BC= 7.5 cm , DE= 12.5cm and area of $\triangle ABC = 13.5cm^2$. Find the area of $\triangle ADE$.



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10. $\triangle ABC$ is right angled at A and $AD \perp BC$. If BC = 13 cm and AC= 5 cm. find the ratio of the areas of $\triangle ABC$ and $\triangle ADC$.

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Exercise 6 D

1. Find whether the sides of the triangle,as given below form a right triangle or not

(1) 9 cm, 12 cm and 15 cm

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2. In $\triangle ABC$ right angled at C. AB= 1.7 cm, BC= 1.5 cm, find CA

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3. A ladder reaches a window which is 15 metres above the ground on one side of the street. Keeping its food at the same point, the ladder is turned to the other side of the street to reach a window 8 metre high. Find the width of the street, if the length of the ladder is 17 metres.

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4. A man goes 40m due north and then 50m due west. Find his distance from the starting point.

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5. The side of a rhombus is 13 cm. if one if the diagonals is 24 cm, find the length of the other diagonal.

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6. In the adjoining figure: $\angle PSQ = 90^\circ$, PQ= 10 cm , QS = 6cm and RQ = 9cm . Calculate the length of PR.

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7. ABC is a isosceles right angled triangle, right angled at C. prove that $AB^2 = 2AC^2$

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8. $\triangle ABC$ is an isosceles triangle with AC = BC. If $AB^2 = 2AC^2$. Prove that $\triangle ABC$ is a right triangle.

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9. In an equilateral $\triangle ABC$, AD is the altitude drawn from A on the side BC. Prove that $3AB^2 = 4AD^2$

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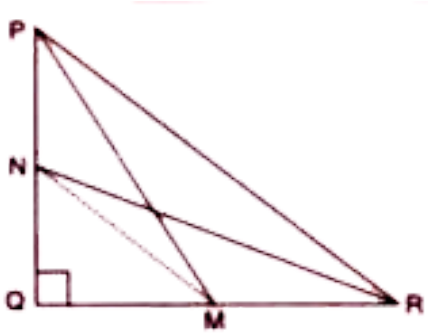
10. M and N are point on sides QR and PQ respectively of $\triangle PQR$, right-angled at Q. Prove that :

$PM^2 + RN^2 = PR^2 + MN^2$



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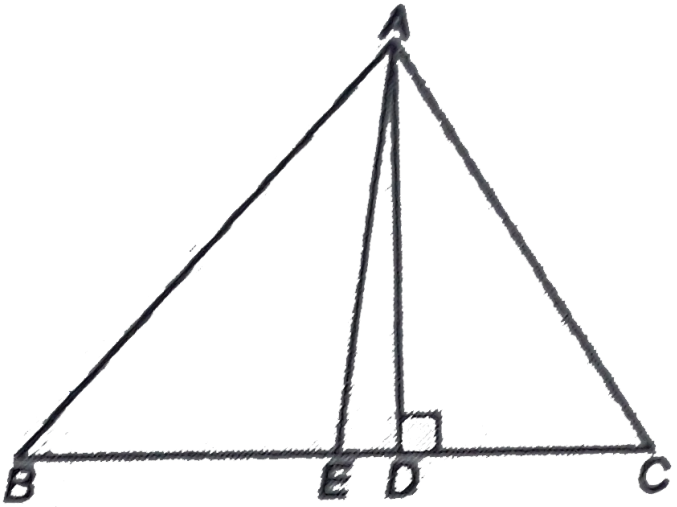
11. The given figure shows a triangle ABC, in which $AB > AC$. E is the mid-point of BC and AD is perpendicular to BC. Prove that

$AB^2 - AC^2 = 2BC \times ED.$



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12. In a square ABCD, show that $AC^2 = 2AB^2$.

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13. In a rhombus ABCD, prove that $AC^2 + BD^2 = 4AB^2$

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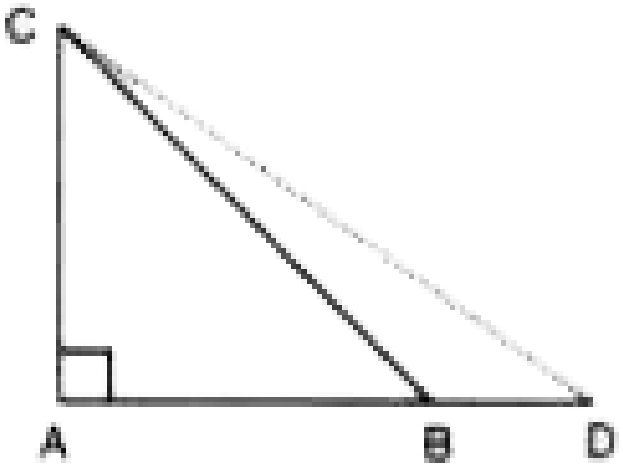
14. In triangle ABC, angle $A = 90^\circ$, $CA = AB$ and D is a point on AB produced. Prove that:

$DC^2 - BD^2 = 2AB.\ AD.$



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15. In acute angled triangle ABC, AD is median and AE is altitude , prove that:

(i) $AC^2 = AD^2 + BC \times DE + \frac{1}{4}BC^2$

(ii) $AB^2 = AD^2 - BC \times DE + \frac{1}{4}BC^2$

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

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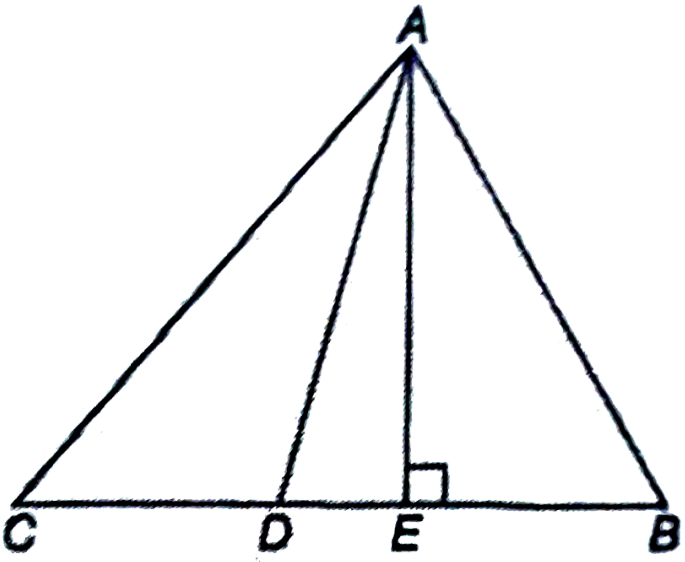
16. The following figure shows a triangle ABC in which AD is a median and $AE \perp BC$. Prove that $2AB^2 + 2AC^2 = 4AD^2 + BC^2$.



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17. From a point O in the interior of a ABC , perpendiculars OD, OE and OF are drawn to the sides BC, CA and AB respectively. Prove that: (i)

$AF^2 + BD^2 + CE^2 = OA^2 + OB^2 + OC^2 - OD^2 - OE^2 - OF^2$ (ii)

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

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18. In an acute angled triangle ABC, AD is the median in it. then :

AD^2 =

A. $\frac{AB^2}{3} + \frac{AC^2}{2} - \frac{BC^2}{4}$

B. $\frac{AB^2}{2} + \frac{AC^2}{2} - \frac{BC^2}{4}$

C. $\frac{AB^2}{2} + \frac{AC^2}{3} - \frac{BC^2}{4}$

D. None

Answer: B

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19. In a right triangle ABC, right angled at A, AD is drawn perpendicular to BC. Prove that:

$AB^2 - BD^2 = AC^2 - CD^2$

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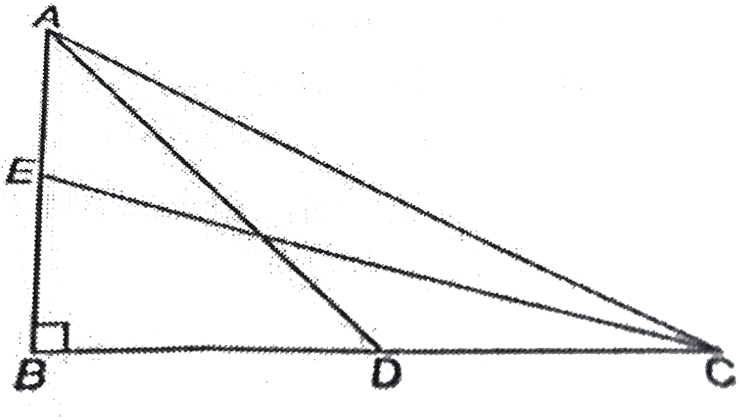
20. In the given figure , ABC is a right triangle, right angled at B. Medians AD and CE are of respective length 5 cm and $2\sqrt{5}cm$. Find the length of AC.



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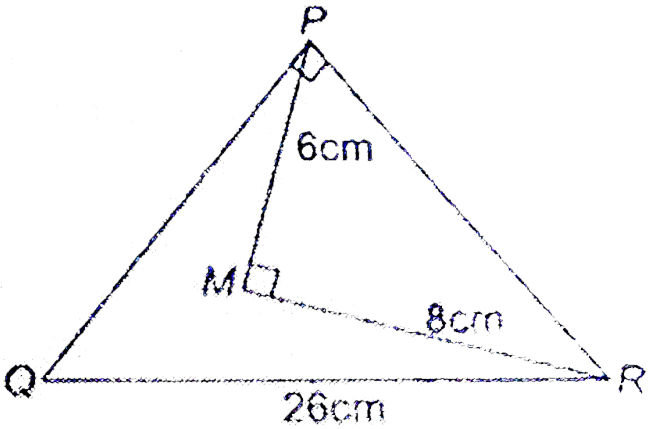
21. In the given figure , $\angle QPR = 90^\circ$ QR = 26 cm PM = 6cm, MR = 8cm and $\angle PMR = 90^\circ$. Find the area of triangle PQR.



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22. Given a right angled $\triangle ABC$. The lengths of the sides containing the right angle are 6 cm and 8 cm. A circule is inscribed in $\triangle ABC$. Find th radius of the circle.

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23. In an acute-angled triangle, express a median in terms of its sides.

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24. In a quadrilateral ABCD, $\angle B = 90^\circ$ and $AD^2 = AB^2 + BC^2 + CD^2$ prove that $\angle ACD = 90^\circ$

.

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25. ABC is a right triangle right-angled at $CandAC = \sqrt{3}BC$. Prove that $\angle ABC = 60^0.$

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26. In $\triangle ABC, \angle A = 60^\circ$ prove that $BC^2 = AB^2 + AC^2 - AB.AC$

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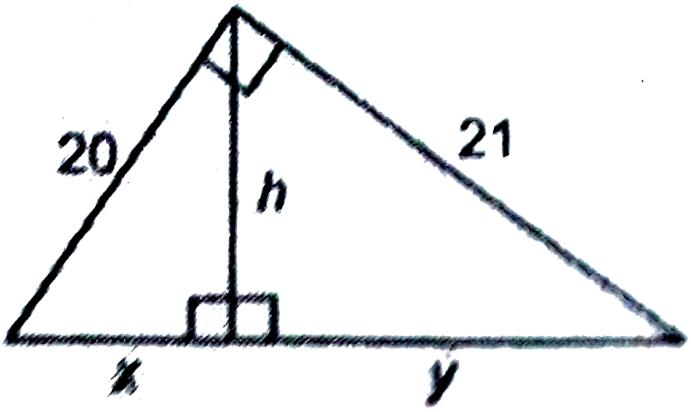
27. In the adjoining figure, find x,y and h.



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Revision Exercise Very Shot Questions

1. (a) State the basic proportionality theorem.

(b) state the mid-point theorem.

© State pythagoras theorem.

(d) State the conditions for similarity of two triangles.

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Revision Exercise Very Short Questions

1. M and N are points on sides AC and BC respectively of a $\triangle ABC$. State whether MN||BA` if CM = 4.2 cm, MA= 2.8 cm , NB = 3.6 cm, CN = 5.7 cm.

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2. If DE||BC in $\triangle ABC$ where D and E are points on AB and AC respectively. If $\frac{AD}{AB} = \frac{8}{15}$ and EC = 3.5 cm , find AE.

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3. If in $\triangle ABC$, AD is the bisector of $\angle A$ and D lies on BC. If AB = 6.4 cm, AC = 8 cm, BD = 5.6 cm, find DC.

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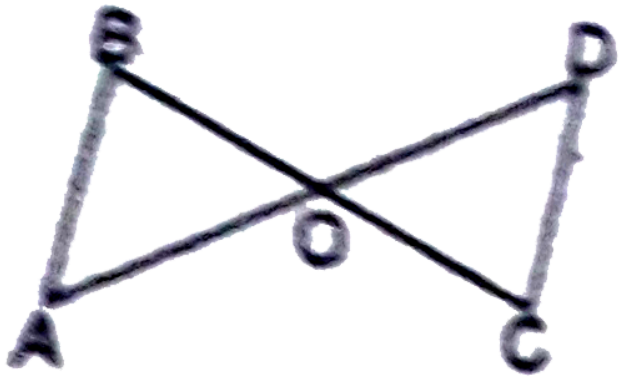
4. In the given figure $\triangle AOB \sim \triangle DOC$, prove that AB||CD.



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5. A man goes 24m due wes and then 10 m due north. How far is he from the staring point?

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6. find the height of an equlateral triangle having each side 12 cm.

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7. $\triangle ABC$ is an isoscles triangle with AB= AC= 13 cm and the length of altitude from A on BC is 5 cm, find BC.

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8. In $\triangle ABC$ if $\frac{AB}{AC} = \frac{BD}{DC}$ and if $\angle B = 70^\circ$ and $\angle C = 50^\circ$ $f \in d\angle BAD$

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9. In a rhombus of side 10 cm one of the diagonals is 12 cm long. Find the length of second diagonal.

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Revision Exercise Short Questions

1. In an equilateral triangle ABC , D is the mid-point of AB and E is the mid-point of AC. Find the ratio between ar ($\triangle ABC$) : $ar(\triangle ADE)$

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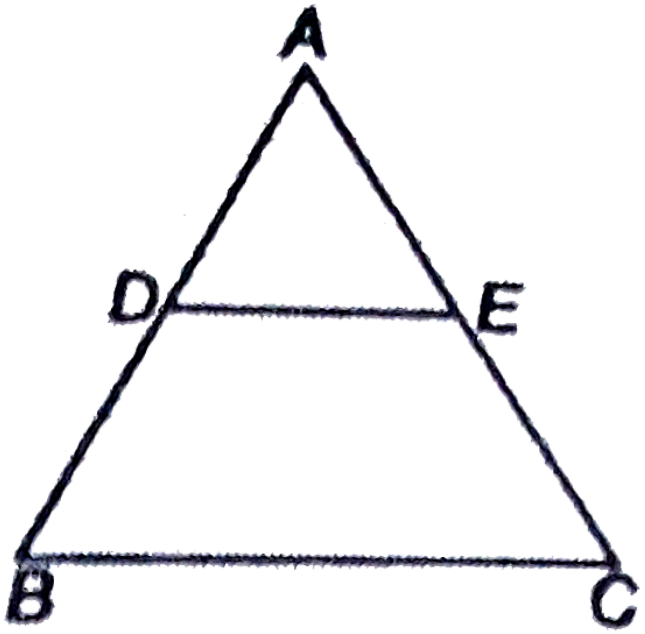
2. In the given figure, DE||BC and $\frac{AD}{DB} = \frac{2}{3}$ if AE=3.7 cm , find EC.



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3. If P and Q are points on the sides AB and AC respeactively of $\triangle ABC$, if PQ||BC,l AP= 2 cm , AB = 6 cm and AC= 9 cm find AQ.

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4. If the diagonal BD of a quadrilateral $ABCD$ bisects both $\angle B$ and $\angle D$, show that $\frac{AB}{BC} = \frac{AD}{CD}$.

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5. Prove by vector method that the line segment joining the mid-points of the diagonals of a trapezium is parallel to the parallel sides and equal to half of their difference.

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6. A man goes 150 m due east and then 200 m due north. How far is he from the starting point ?

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7. In an equilateral triangle with side a, prove that the altitude is of length $\frac{a\sqrt{3}}{2}$

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

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9. find the length of the diagonal of a rectangle whose sides are 8 m and 6m.

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10. the side of a triangle are $\frac{1}{2}(a+b), \frac{1}{2}(a-b)$ and $\sqrt{ab}$ state the nature of triangle.

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Revision Exercise Long Questions

1. The bisector of interior $\angle A of \triangle ABC$ meets BC in D, and the bisector of exterior angle $\angle A$meets BC produced in E. prove that $\frac{BD}{BE} = \frac{CD}{CE}$

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2. AD is a median of ABC . The bisector of $\angle ADB$ and $\angle ADC$ meet $ABandAC$ in $EandF$ respectively. Prove that $EFBC$.

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3. $\triangle ABC$ and $\triangle DBC$ are two triangles on the same base BC. A and D lies on opposite sides of BC. Prove that $\frac{ar(\triangle ABC)}{ar(\triangle DBC)} = \frac{AO}{DO}$

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4. Prove that three 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.

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Revision Exercise Long Questions

1. Two triangles $BACandBDC$, right angled at $AandD$ respectively, are drawn on the same base BC and on the same side of BC. If AC and DB intersect at P, prove that $APxPC = DPxPB$.

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