doubtnut
India's Number 1 Education App

MATHS

BOOKS - CHETAN MATHS (TAMIL ENGLISH)

SIMILARITY

Example

1. In ΔABC ray BD bisects $\angle ABC$ $A - D - C$, side DE $||$ side BC

$A - E - B$

then prove, $\frac{AB}{BC} = \frac{AE}{EB}$

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Practice Set 11

1. Base of a triangle is 9 and height is 5. Base of another is 10 and height is 6 . Find the ratio of areas of these triangles.

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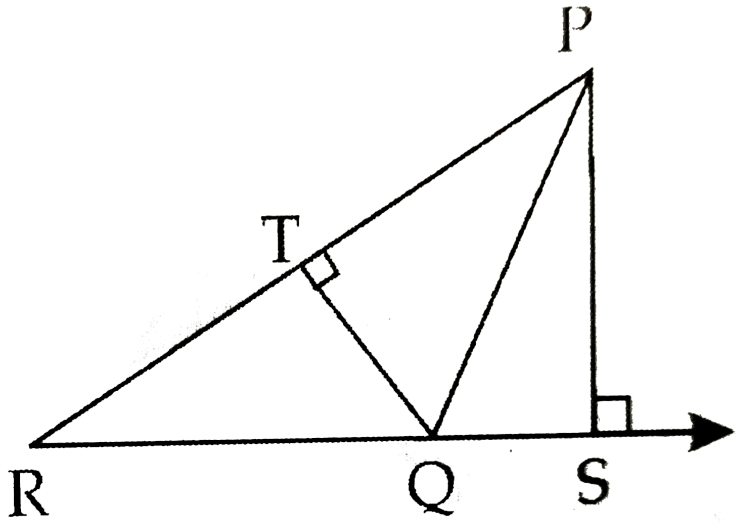
2. In the adjoining figure seg $PS \perp$ ray RQ, seg $QT \perp$ seg PR. If $RQ = 6, PS = 6$ and $PR =$



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3. In adjoining figure $AP \perp BC, AD \| BC$, then find $A(\Delta ABC) : A(\Delta BCD)$

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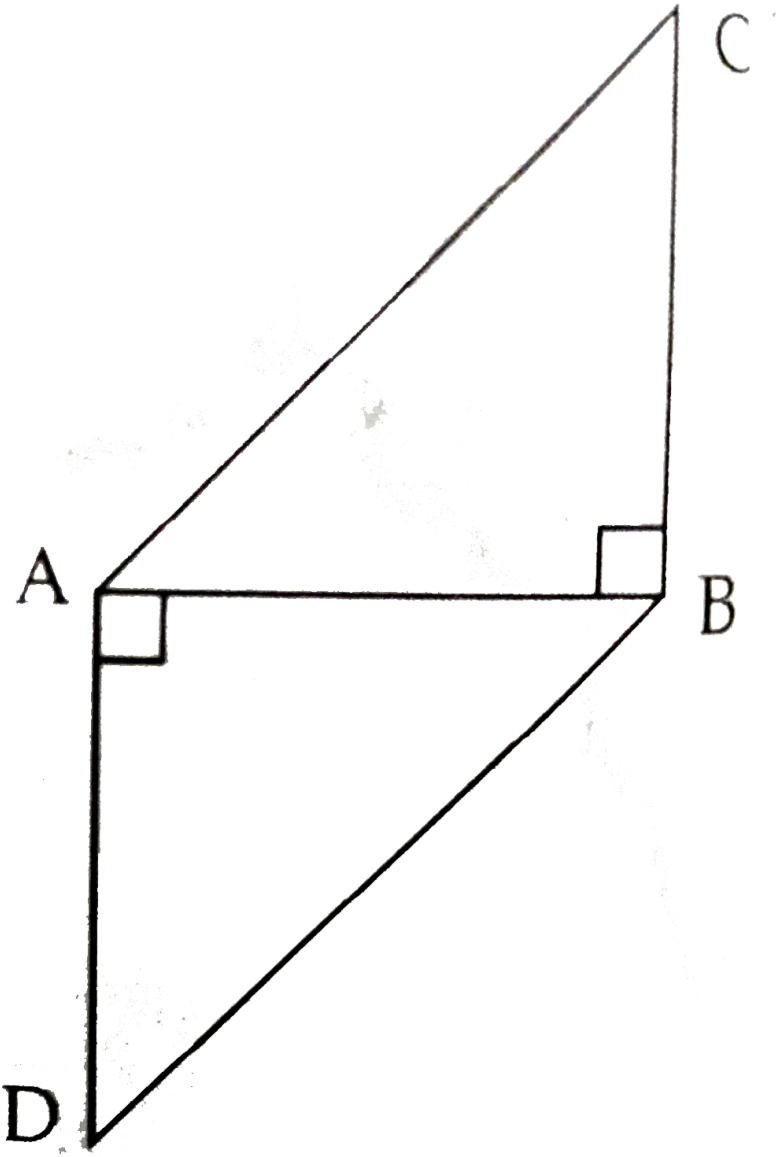
4. In figure $BC \perp AB, AD \perp AB, BC = 4, AD = 8$ then find $\frac{A(\Delta ABC)}{A(\Delta ADB)}$



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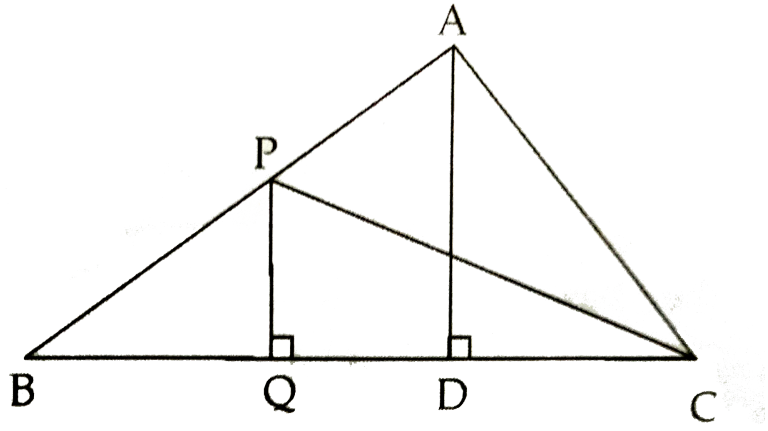
5. In the adjoining figure , $PQ \perp BC$, $AD \perp BC$ then find the following ratios

$$\frac{A(\Delta PQB)}{A(\Delta PBC)}$$



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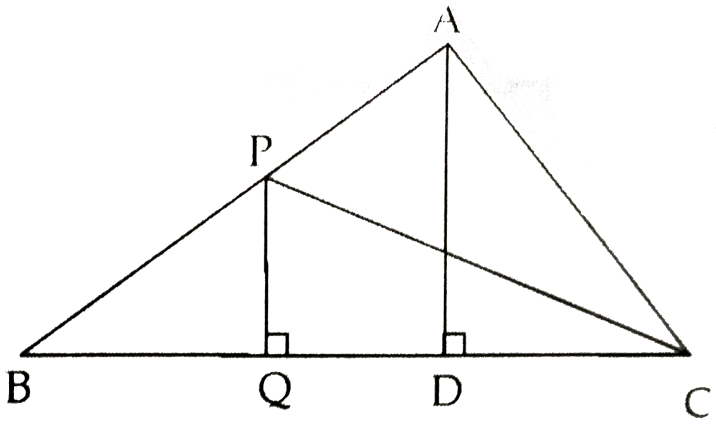
6. In the adjoining figure , $PQ \perp BC$, $AD \perp BC$ then find the following ratios

$$\frac{A(\Delta PBC)}{A(\Delta ABC)}$$



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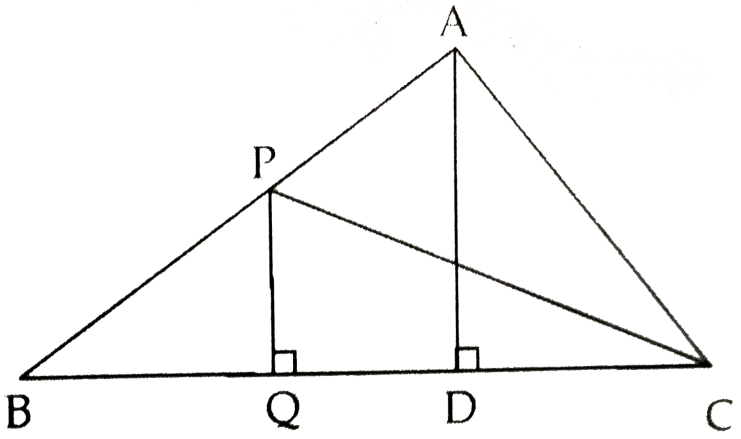
7. In the adjoining figure , $PQ \perp BC$, $AD \perp BC$ then find the following ratios

$\frac{A(\Delta ABC)}{A(\Delta ADC)}$



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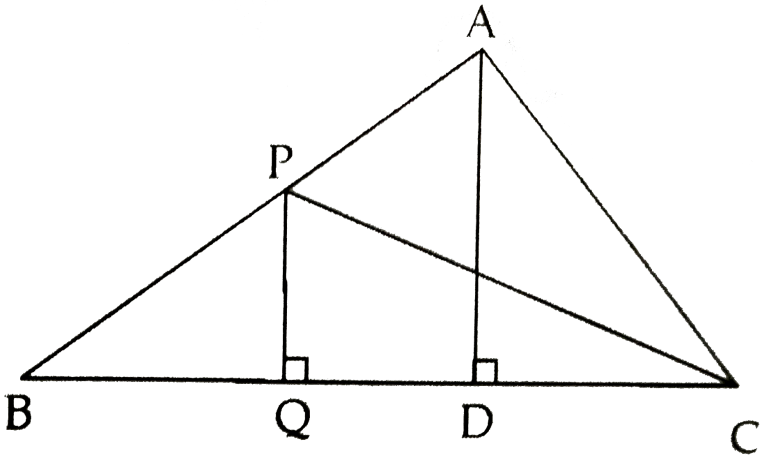
8. In the adjoining figure , $PQ \perp BC$, $AD \perp BC$ then find the following ratios $\frac{A(\Delta ADC)}{A(\Delta PQC)}$



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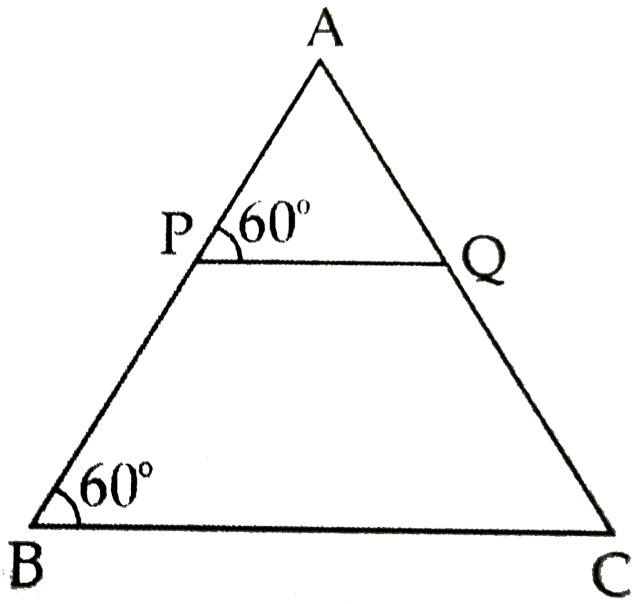
Practice Set 1 2

1. Measurements of the some angles in the figure are given . Prove that $\frac{AP}{PB} = \frac{AQ}{QC}$



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2. In ΔPQR,

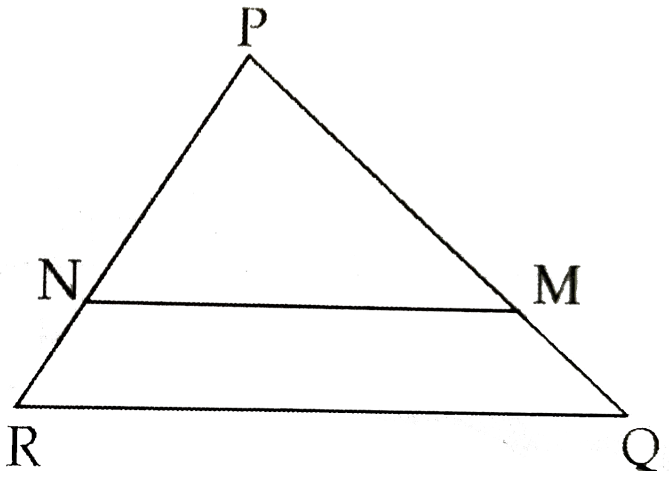
$PM = 15$,

$PQ = 25$,

$PR = 20$,

$NR = 8$

whether lin NM is parallel to side RQ ? Give reason.



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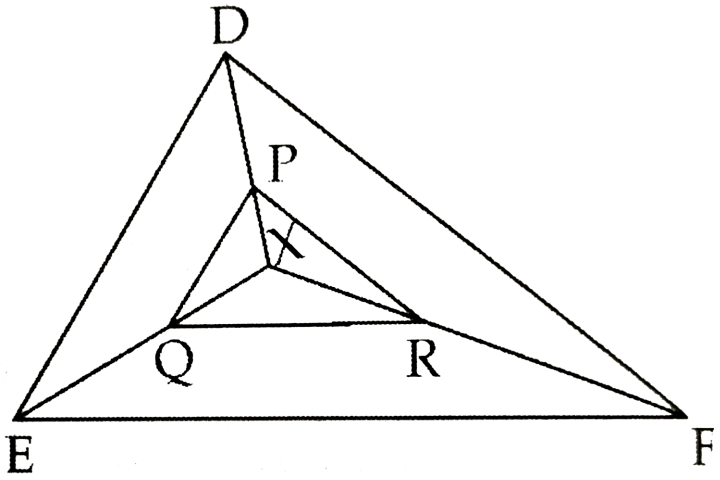
3. In the adjoining figure X id any point in interior of triangle . Point X is joined to vertices of traingle. seg PQ | | DE,

seg QR | | segEF . Then fill in the blanks to prove that ,

seg PR | | seg DF.



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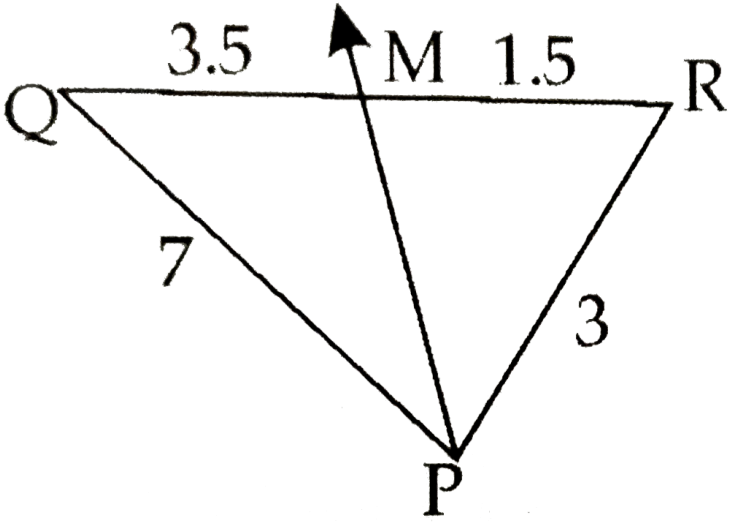
4. Given below some triangles and lengths of line segments . Identity in which figures , Ray PM is bisector of $\angle QPR$.



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5. Given below some triangles and lengths of line segments . Identity in which figures , Ray PM is bisector of $\angle QPR$.

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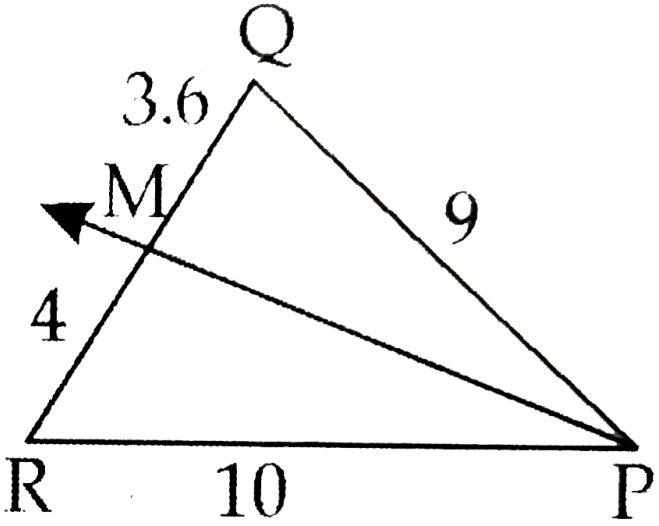
6. Given below some triangles and lengths of line segments . Identity in which figures , Ray PM is bisector of $\angle QPR$.



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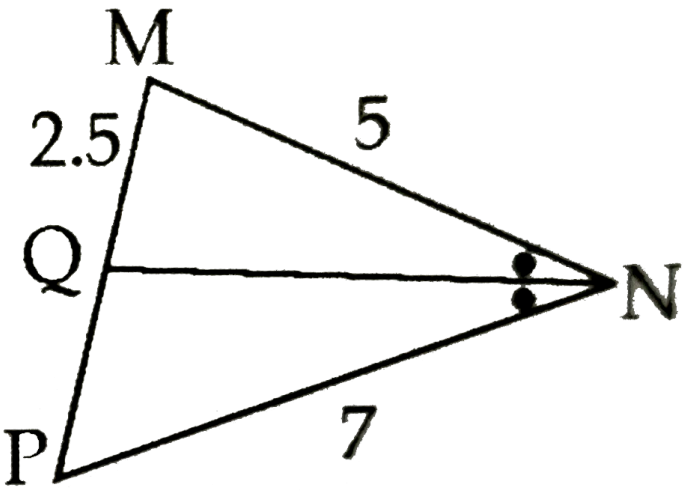
7. In ΔMNP, NQ is bisector of $\angle N$. if $MN = 5, PN = 7, MQ = 2.5$

then find QP.



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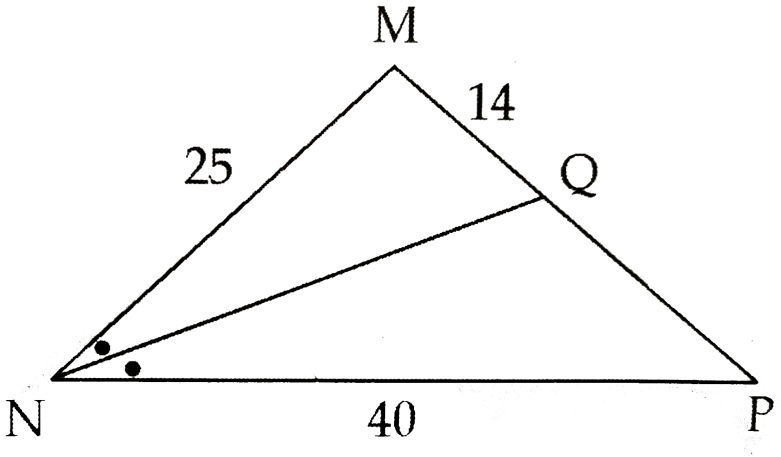
8. Find QP using given information in the figure.



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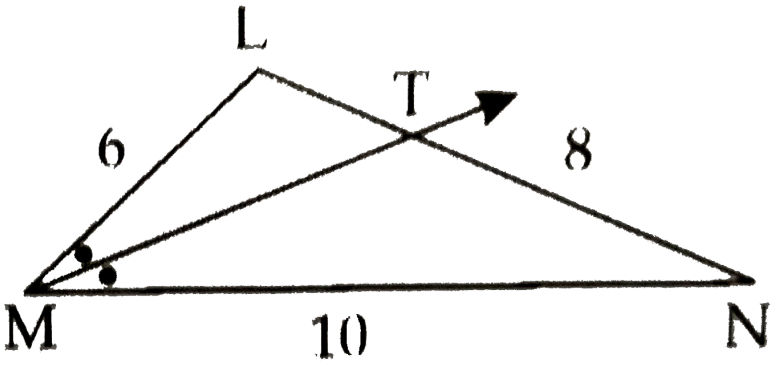
9. In

ΔLMN, Ray MT bisects $\angle LMN$, $LM = 6$, if $MN = 10, TN = 8.$

then find LT.



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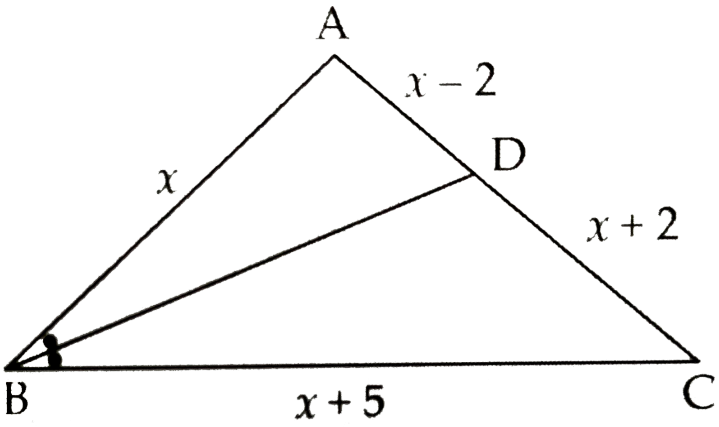
10. In

ΔABC, seg BD bisects $\angle ABC$, if$AB = x, BC = x + 5, AD = x - 2,$

.Then find the value of x.



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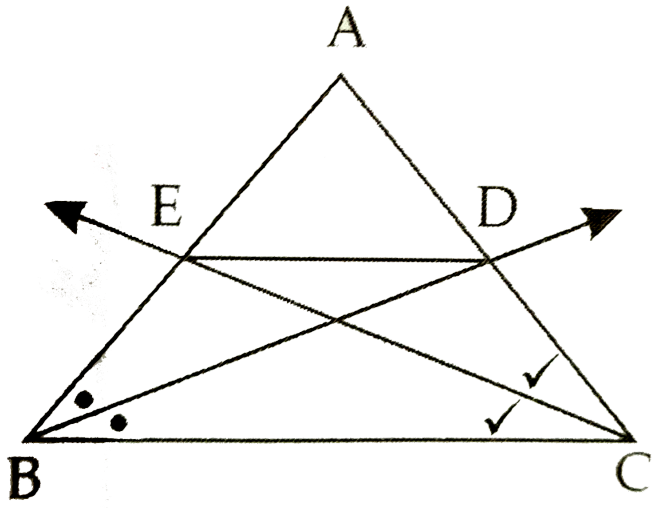
11. In

ΔABC, seg BD bisects $\angle ABC$ and Ray CE bisects $\angle ACB$. if seg

then prove that ED||BC.



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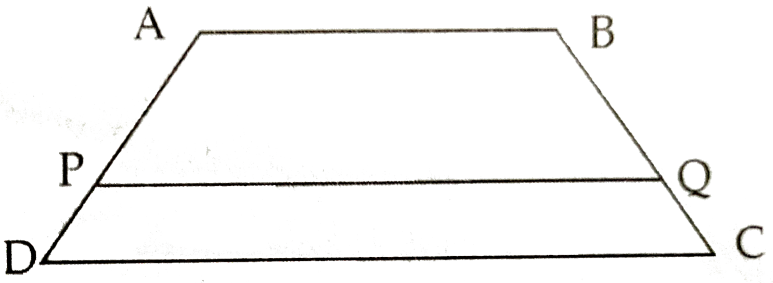
12. In trapezium ABCD ,side AB||sidePQ||sideDC. AP=15, PD= 12, QC =14. Find BQ.



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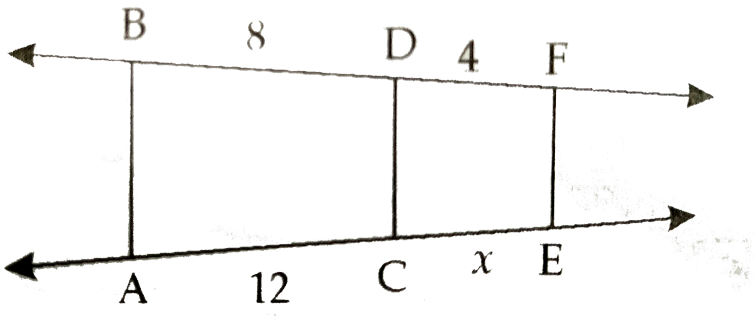
13. In the adjoining figure AB||CD||EF. Find x and AE.



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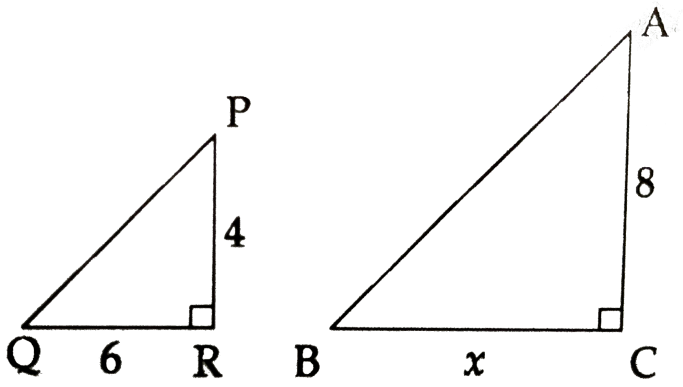
Practice Set 1 3

1. As shown in adjoining figure , two poles of height 8 m and 4 mare perpendicular to ground . If the length of shodow of smaller pole due to sunlight is 6 m then how long will be the shadow of bigger pole at at the

same time?



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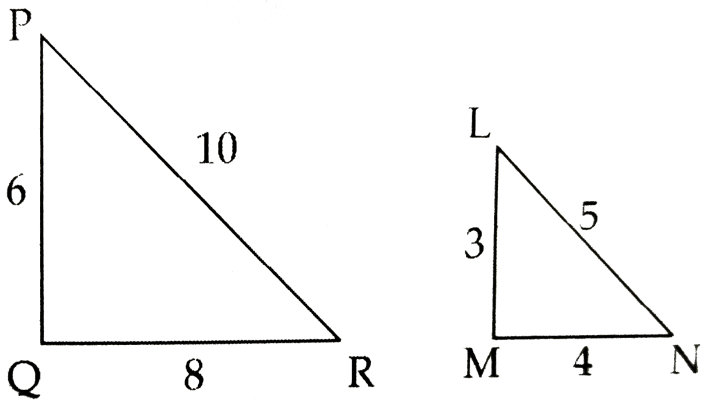
2. Are the triangles in the figure given similar ?



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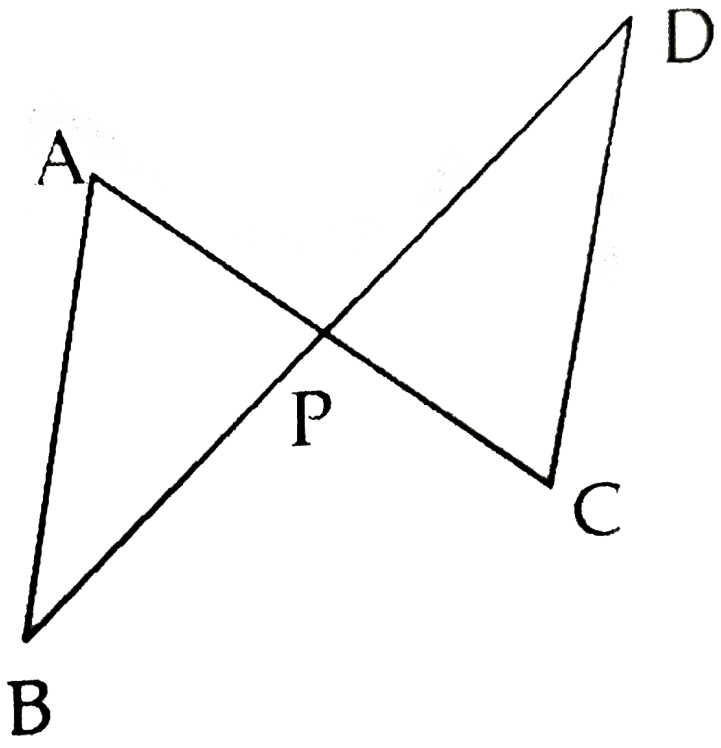
3. In the figure seg AC and seg BD intersects each other at point P and $\frac{AP}{CP} = \frac{BP}{DP}$. Then Prove that $\Delta ABP \sim \Delta CDP$.



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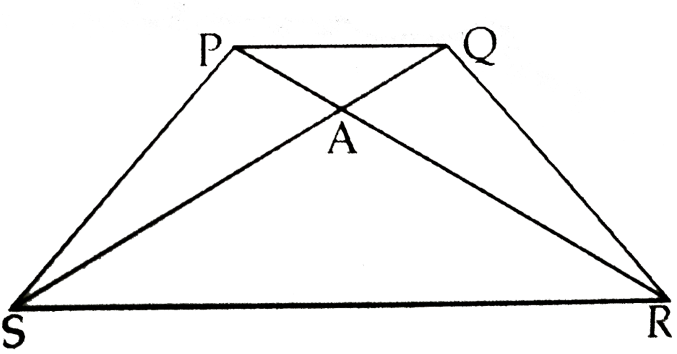
4. In trapezium PQRS , side PQ|| side SR. AR= 5 AP and AS = 5AQ. Prove that : SR = 5PQ



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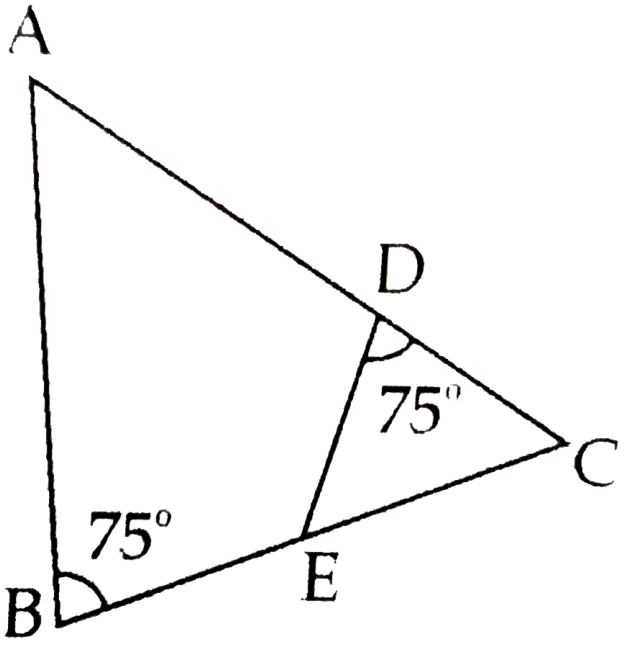
5. In adjoining figure, $\angle ABC = 75^\circ, \angle EDC = 75^\circ$ state which two traiangles are similar and by which test ? Also traingles by a proper one

to one correspondence



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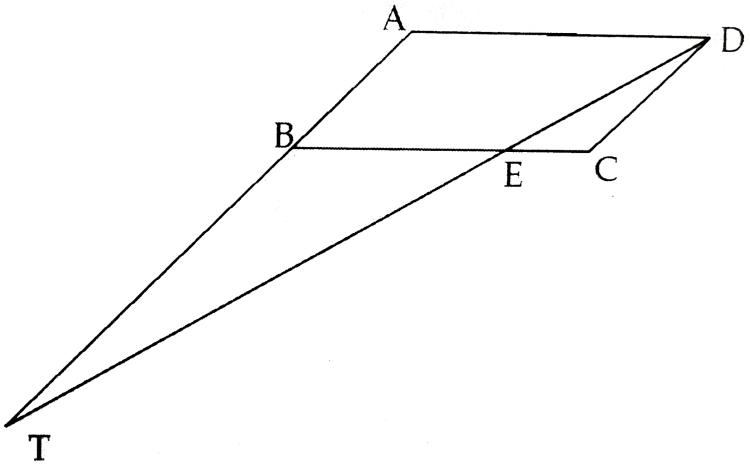
6. □ $ABCD$ is a parallelogram. Point E is on side BC , line DE intersects Ray AB in point . T Prove that : $DE \times BE = CE \times TE$.



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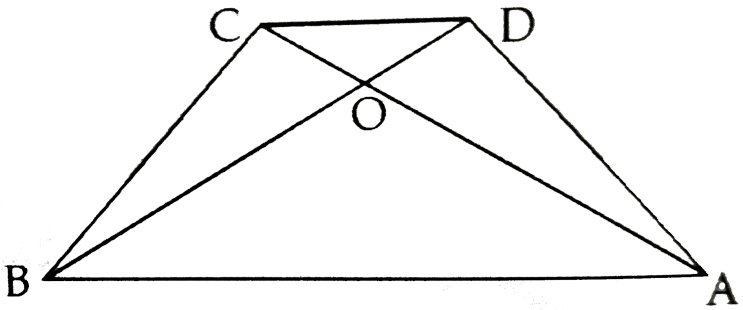
7. In trapezium ABCD , side $AB \mid\mid DC$ Diagonals AC and BD intersect in O . If $AB = 20, DC = 6, OB = 15$. Find OD.



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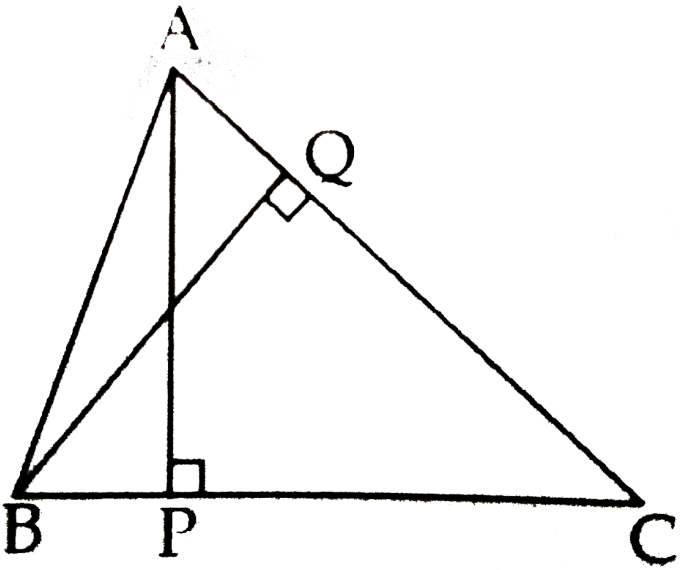
8. In

$\Delta ABC, AP \perp BC, BQ \perp AC, B - P - C, A - Q - C$ then prove that Δ



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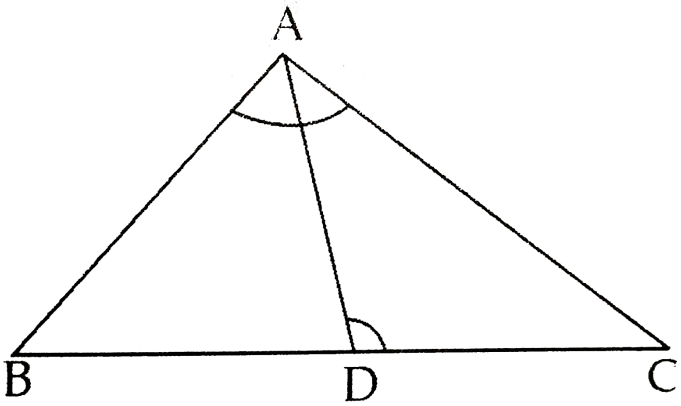
9. In the figure , in ΔABC , point D on side BC is such that , $\Delta BAC \cong \Delta ADC$ then prove that , $CA^2 \equiv CB \times CD$.



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Practice Set 1 4

1. If $\Delta ABC \sim \Delta PQR$ and $AB : AP = 2 : 3$, then fill in the blanks.

$$\frac{A(\triangle ABC)}{A(\triangle PQR)} = \frac{(AB)^2}{(PQ)^2} = \frac{2^2}{3^2} = \frac{\square}{\square}$$

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2. Ratio of correspoding sides of two similar traingles is $3 : 5$, then find ratio of their area.

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3. If $\Delta ABC \sim \Delta PQ$, $A(\Delta ABC) = 80$, $A(\Delta PQR) = 125$, then fill in the blanks.

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4. $\Delta LMN \sim \Delta PQR$, $9 \times A(\Delta PQR) = 16 \times A(\Delta LMN)$. If QR = 20 , then find MN.

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5. Areas two similar triangles are 225 sq. cm , 81 sr. cm If a side of the smaller traingles is 12 cm , then find correspoding side of bigger traingle.

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6. ΔABC and ΔDEF are equilateral triangles. If $A(\Delta ABC) : A(\Delta DEF) = 1:2$ and $AB = 4$, find DE.

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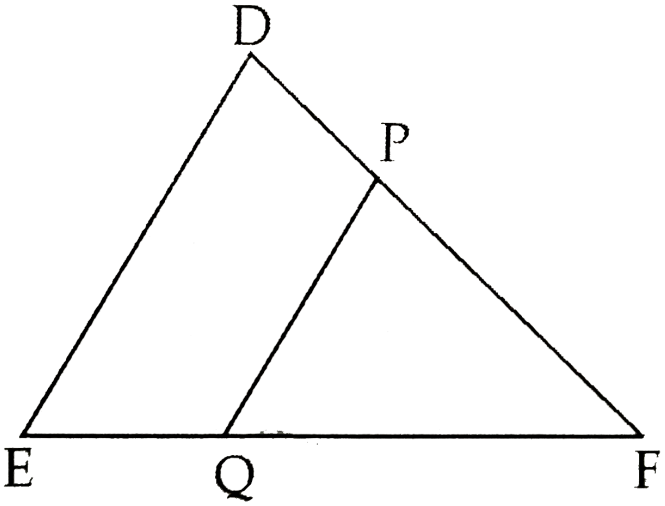
7. In the adjoining figure , seg $PQ \mid\mid$ seg DE, $A(\Delta PQF) = 20$ sq units . PF = 2 , then find $A(\square DPQE)$ by completing the following activity.



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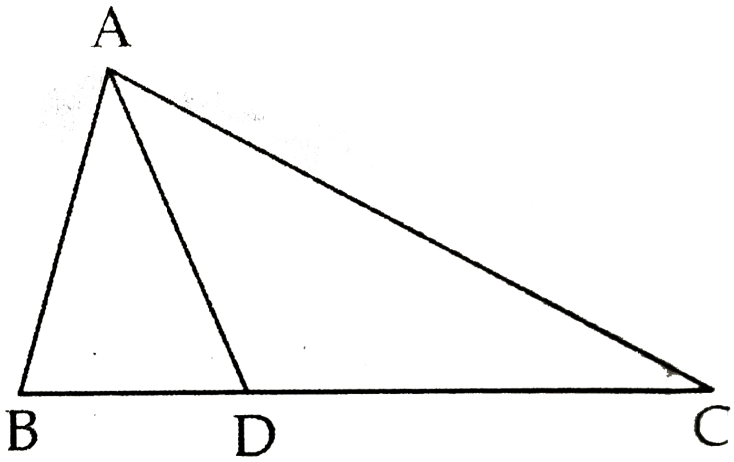
Problem Set 1

1. In $\Delta ABC, B-D-C$ and $BD=7, BC=20$ Then find the following ratio.

$$\frac{A(\Delta ABD)}{A(\Delta ADC)}$$



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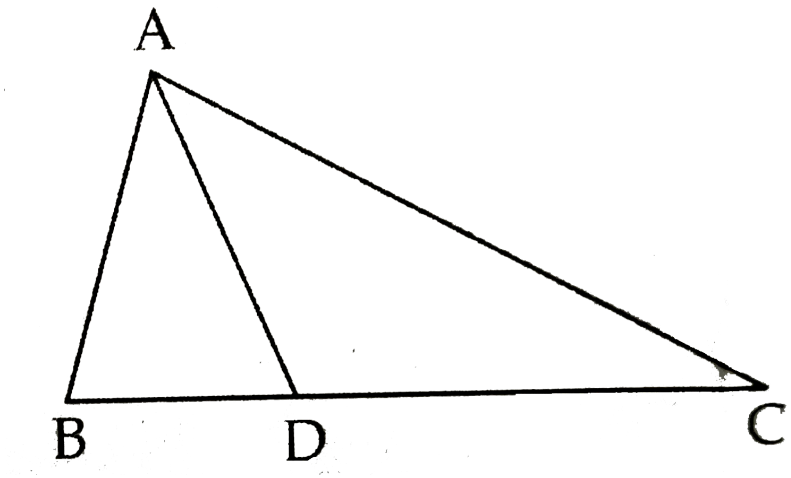
2. In $\Delta ABC, B-D-C$ and $BD=7, BC=20$ Then find the following ratio.

$$\frac{A(\Delta ABD)}{A(\Delta ABC)}$$



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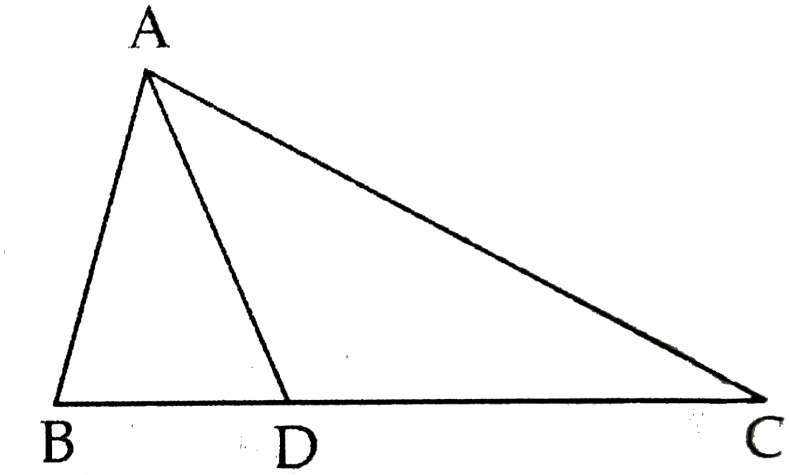
3. In $\Delta ABC, B-D-C$ and $BD=7, BC=20$ Then find the following ratio.

$\frac{A(\Delta ADC)}{A(\Delta ABC)}$



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4. Ratio of areas of two triangles with equal height is $2:3$. If base of smaller traiangle is 6 cm then what is the correponding base of the bigger triangles.

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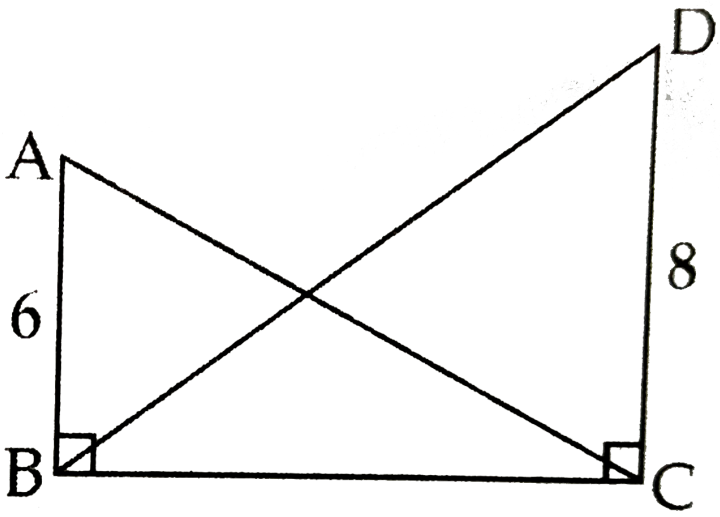
5. In the figure given $\angle ABC = \angle DCB = 90^\circ$. $AB = 6, DC = 8$. then $\frac{A(\Delta ABC)}{A(\Delta DCB)}$?



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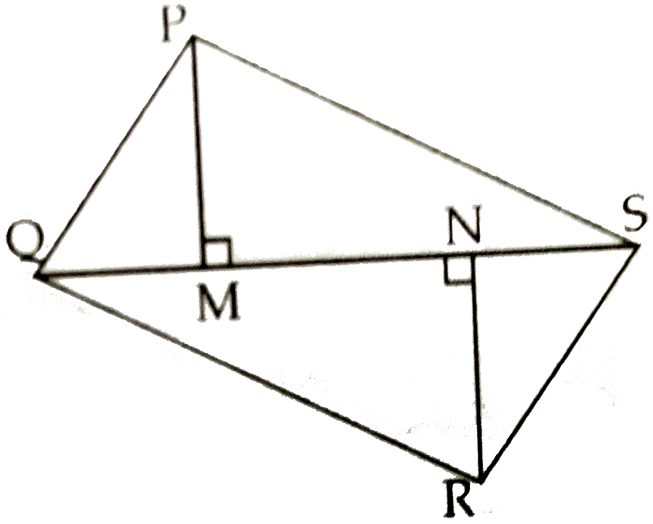
6. In the adjoining figure , $PM = 10\text{cm} A(\Delta PQS) = 100 \text{ sq cm} A(\Delta QRS) = 110 \text{ sq cm}$ then

find NR.



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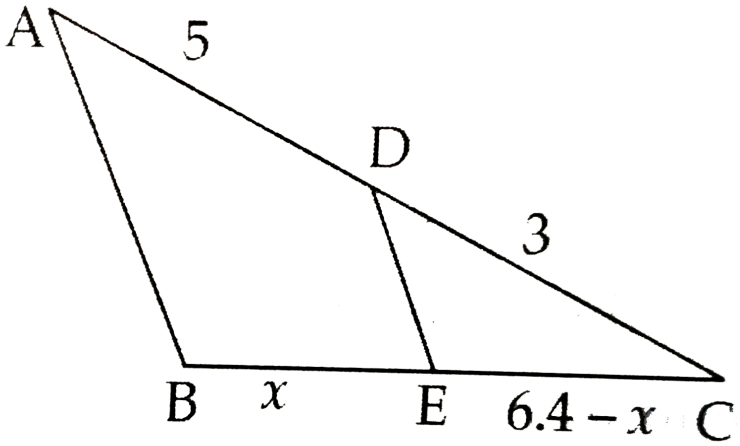
7. In the figure $A - D - C$ and $B - E - C$. seg $DE \mid\mid$ side AB. if $AD = 5, DC = 3,$

then find BE.



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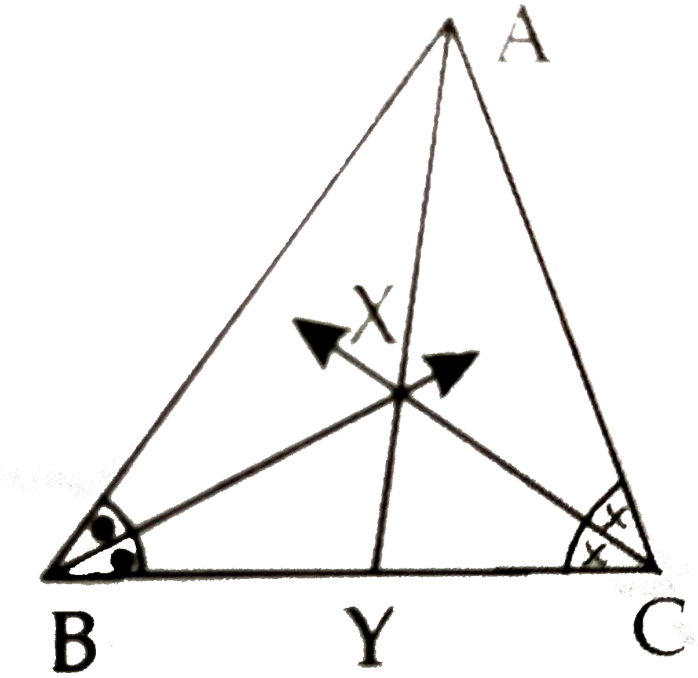
8. In the adjoining figure bisectors of $\angle B$ and $\angle C$ intersect each other in point X. Line AX intersects side BC in point Y.

$AB = 5, AC = 4, BC = 6$ then find $\frac{AX}{XY}$.



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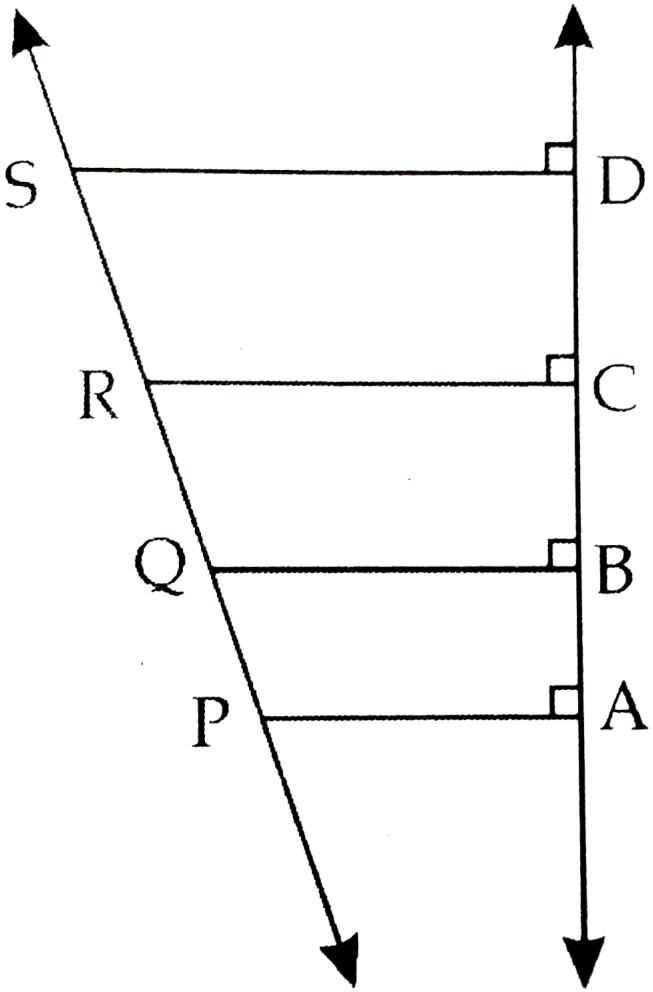
9. In the figure given seg PA, seg QB, seg RC and seg SD are perpendicular to line AD. $AB = 60, BC = 70, CD = 80$ and $PS = 280,$ then find PQ,

QR and RS.



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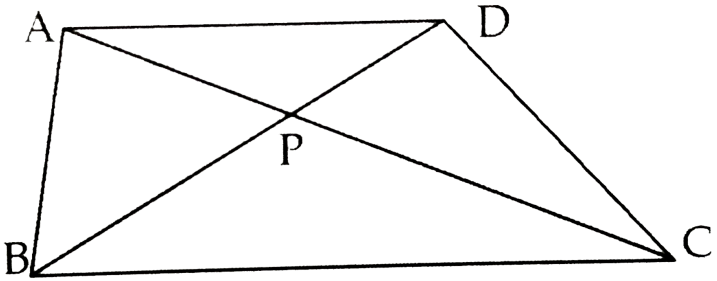
10. In $\square ABCD$, seg AD | | seg BC. Diagonal AC and diagonal BC intersect each other in point P. Then show that $\frac{AP}{PD} = \frac{PC}{BP}$



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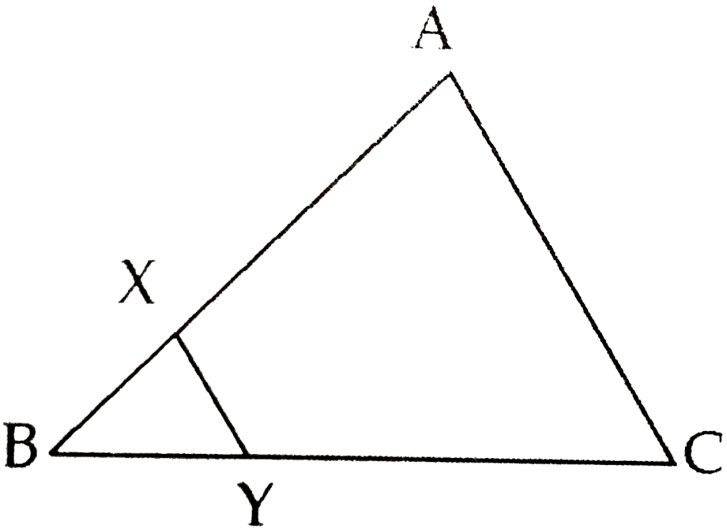
11. In the adjoining figure , XY || seg AC . If$2AX = 3 \times BX$ and $XY = 9$.

Complete the activity to find the value of AC.



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12. $\Delta MNT \sim \Delta QRS$: Length of altitude drawn from vertex T is 5 and length of altitude drawn from vertex S is 9 . Find $\frac{A(\Delta TMN)}{A(\Delta SQR)}$

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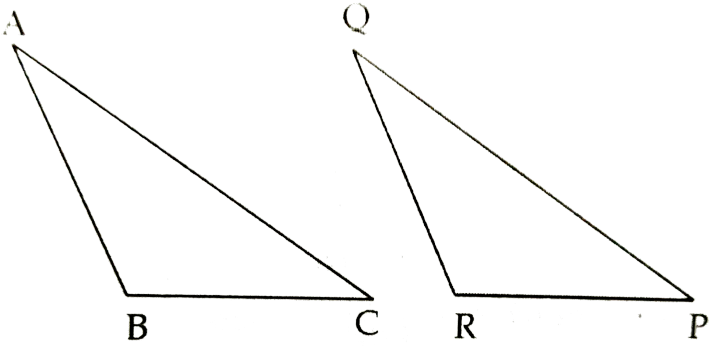
Problem Set 1 Mcqs

1. If in ΔABC and ΔPQR for some one- one correpondence if $\frac{AB}{QR} = \frac{BC}{PR} = \frac{CA}{PQ}$ then



A. $\Delta PQR \sim \Delta ABC$

B. $\Delta PQR \sim \Delta CAB$

C. $\Delta CBA \sim \Delta PQR$

D. $\Delta BCA \sim \Delta PQR$

Answer: A::B::C::D

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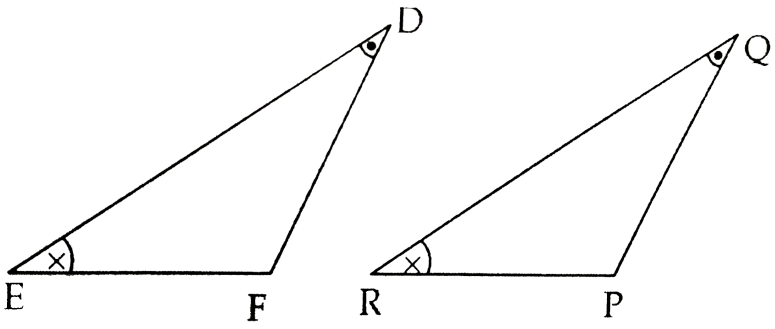
2. If in $\Delta DEF \sim \Delta PQR. \angle D \cong \angle Q, \angle R \cong \angle E$, then which of the following statement is false?



A. $\frac{EF}{PR} = \frac{DF}{PQ}$

B. $\frac{DE}{PQ} = \frac{EF}{RP}$

C. $\frac{DE}{QR} = \frac{DF}{PQ}$

D. $\frac{EF}{RP} = \frac{DE}{QR}$

Answer: B

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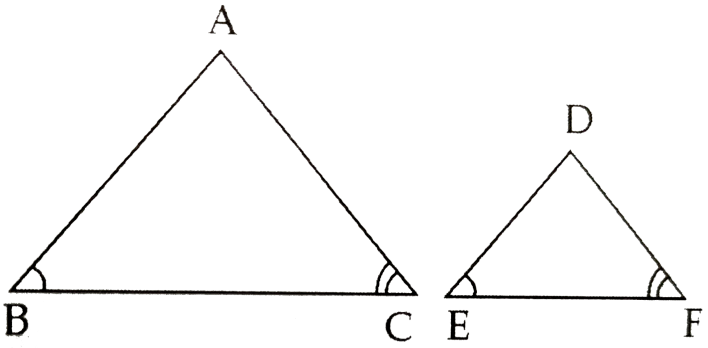
3. In ΔABC and ΔDEF. $\angle B \cong \angle E, \angle F \cong \angle C$ and $AB = 3DE$ then which statement regarding two triangles is true?



A. The triangles are not congruent and not similar.

B. The triangles are similar but not congruent.

C. The triangles are congruent and similar.

D. None of the statements above is true.

Answer: A::B::C

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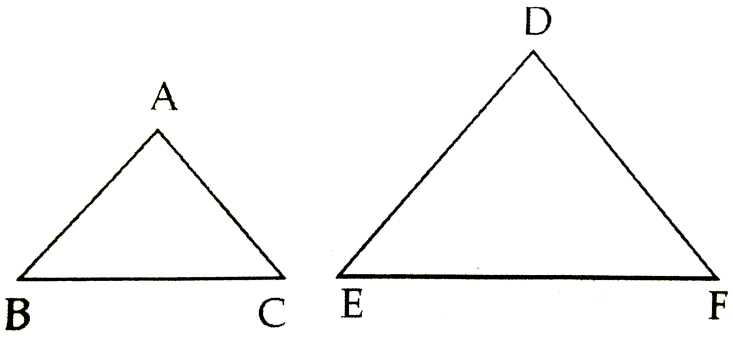
4. ΔABC and ΔDEF both are equilateral triangles. $A(\Delta ABC) : A(\Delta DEF) = 1:2.$. If AB = 4 , then what is the length of DE ?



A. $2\sqrt{2}$

B. 4

C. 8

D. $4\sqrt{2}$

Answer: B::D

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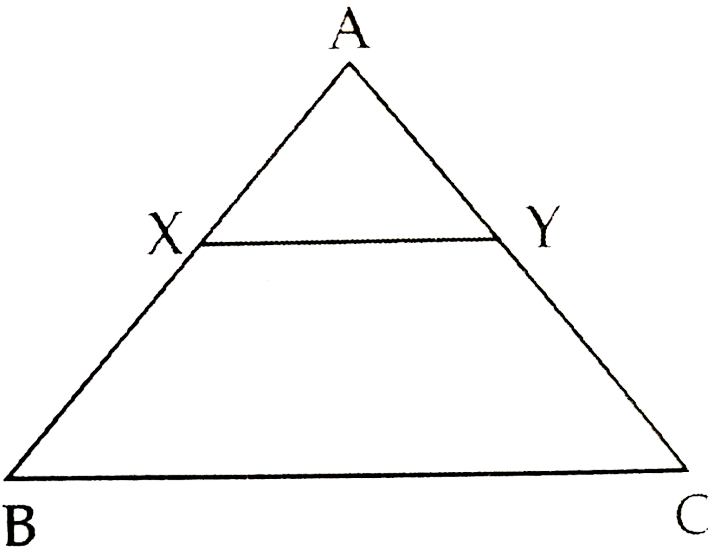
5. In the figure seg XY|| BC , then which of the following statement is true?



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6. In

ΔABC, $AB = 3\text{cm}$, $BC = 2\text{cm}$ and $AC = 2.5\text{cm}$ $\Delta DEF \sim \Delta ABC$, $EF =$

What is the perimeter of ΔDEF ?

A. 30 cm

B. 22.5cm

C. 15 cm

D. 7.5cm

Answer: A::C

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7. The sides of two similar triangles are $4 : 9$. What is the ratio of their area?

A. $2 : 3$

B. $4 : 9$

C. $81 : 16$

D. $16 : 81$

Answer: D

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8. The areas of two similar traingles are 18cm^2 and 32cm^2 respectively. What is the ratio of their corresponding sides?

A. $3:4$

B. $4:3$

C. $9:16$

D. $16:9$

Answer: C::D

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9.

$\Delta ABC \sim \Delta PQR$, $AB = 6\text{cm}$, $BC = 8\text{cm}$, $AC = 10\text{cm}$ and $QR = 6\text{cm}$. . What is the length of side PR?

A. 8 cm

B. 10 cm

C. 4.5cm

D. 7.5cm

Answer: D

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10. In ΔXYZ , ray YM is the bisector of ΔXYZ where XY= YZ and X- M - Z , then which of the relation is true ?

A. XM=MZ

B. $XM \neq MZ$

C. $XM > MZ$

D. None

Answer:

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11. In ΔABC, $AB = 6\text{cm}$, $BC = 8\text{cm}$ and $\text{AC}=10cm\Delta ABC$ is enlarged to ΔPQR such that the largest side is 12.5 cm . What is the length of the smallest side of ΔPQR ?

A. 7.5 cm

B. 9 cm

C. 8 cm

D. 10 cm

Answer: a

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12. In $\Delta ABC, B - D - C$ and $BD = 6\text{cm}, DC = 4\text{cm}$ what is the ratio $A(\Delta ABC)\text{to}\ \ A(\Delta ACD)$?

A. $2:3$

B. $5:2$

C. $3:2$

D. $5:3$

Answer: B

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13. In $\Delta XYZ, PQ \mid\mid YZ, X-P-Y$ and $X-Q-Z$. If $\frac{XP}{PY}=\frac{4}{13}$ and XQ

What is XZ ?

A. 15.6 cm

B. 20.4 cm

C. 7.8 cm

D. 10.2 cm

Answer: B::C::D

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14. In ΔABC , P is a point on side BC such that BP = 4 cm and PC = 7 cm.

$A(\Delta APC) : A(\Delta ABC)$ = ...

A. $11:7$

B. $7:11$

C. $4:7$

D. $7:4$

Answer: B

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15. In ΔPQR seg RS is the bisector of $\angle PQR, PS = 8, SQ = 6, PR = 20$ then QR = ...

A. 10

B. 15

C. 30

D. 40

Answer: B

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16. In ΔABC, line $PQ \mid\mid$ sideBC, $AP = 3$, $BP = 6$, $AQ = 5$ then the value of CQ is .....

A. 20

B. 10

C. 5

D. 16

Answer: B

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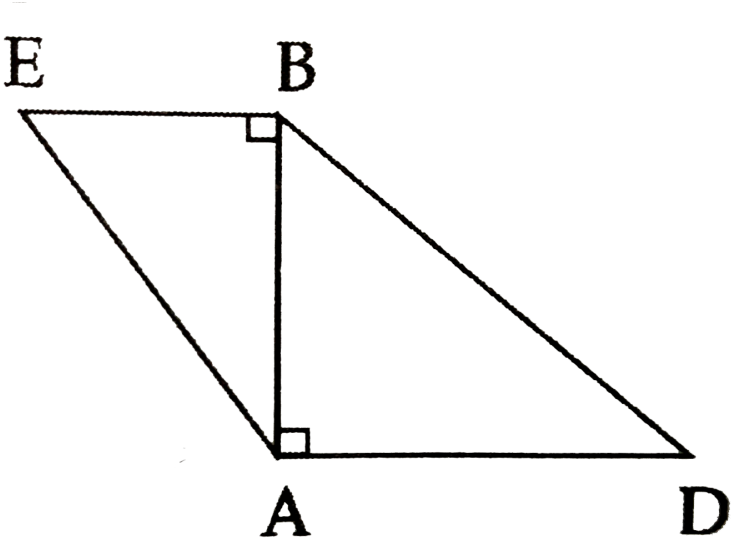
Problems For Practice

1. In the adjoining figure , seg $BE \perp$ seg AB and seg $BA \perp$ seg AD. If BE = 6, AD =9 , the find $A(\Delta ABE) : A(\Delta BAD)$



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2. The ratio of the areas of two traiangles with the common base is 6 : 5 . Height of the larger triangles is 9 cm gt Then find the correspoding height of the smaller triangle.

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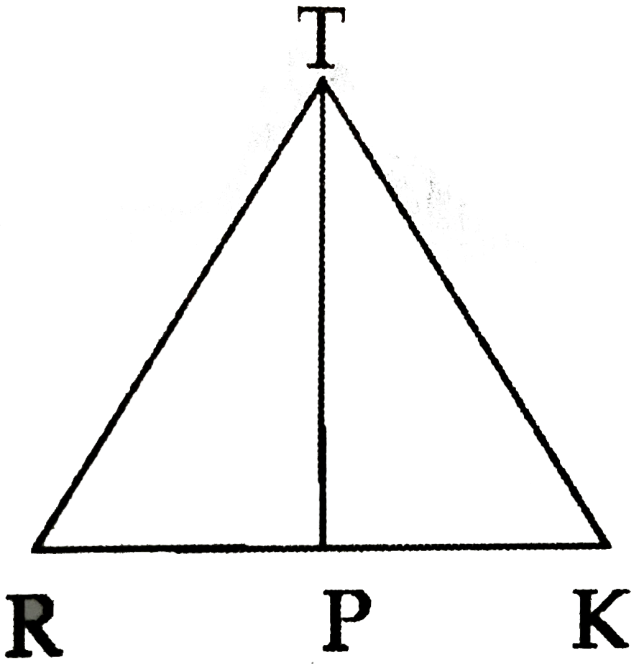
3. In the adjoining figure, RP : PK = 3.2 , then find the value of

(i) $A(\Delta TRP) : A(\Delta TPK)$

(ii) $A(\Delta TRK) : A(\Delta TPK)$

(iii) $A(\Delta TRP) : A(\Delta TRK)$



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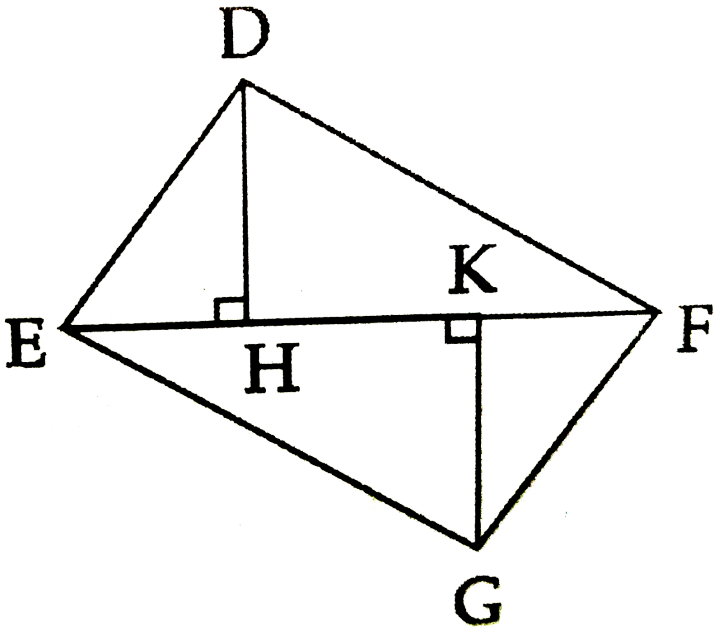
4. In the adjoining figure seg $DH \perp$ seg EF, seg $GK \perp$ seg EF.

If DH = 12 cm , GK =20 cm and $A(\Delta DEF) = 300^{\circ}\,\mathrm{cm}^2$, then find

(i) EF

(ii) $A(\Delta GEF)$



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5. The ratio of the areas of two triangles with equal height is 3 : 2 . The base of the larger triangle is 18 cm . Find the corresponding base of the smaller triangle.

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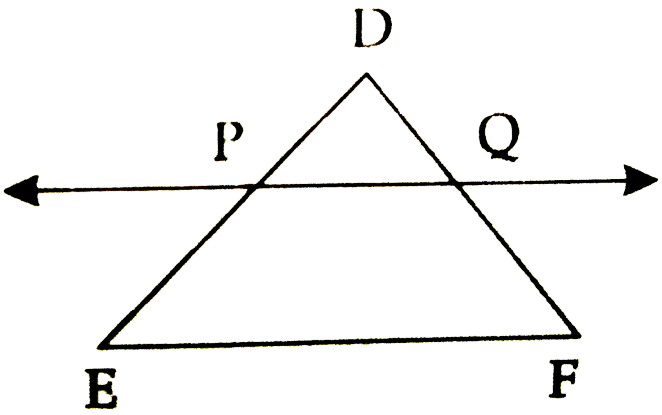
6. In

ΔDEF, line $PQ \mid\mid$ sideEF. $DQ = 1.8$, $QF = 5.4$, $PE = 7.2$. findDE.



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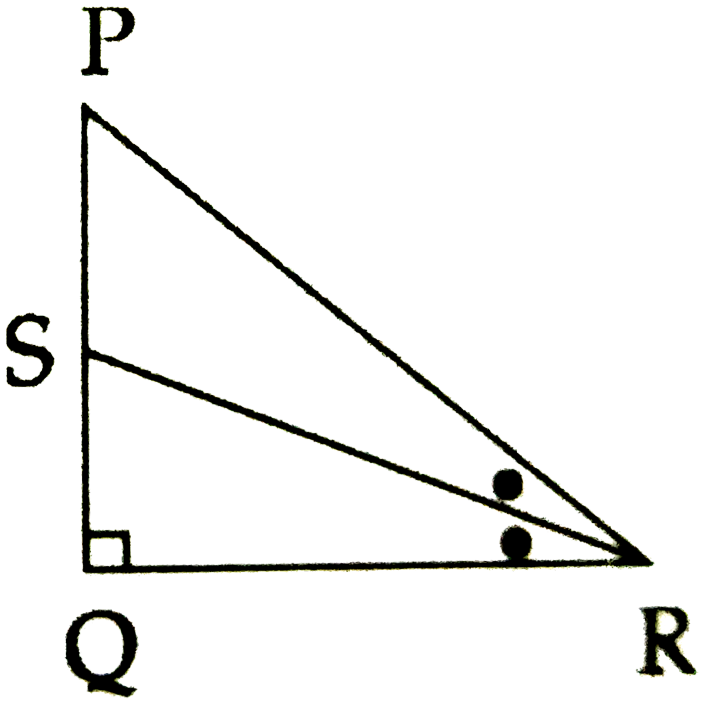
7. In ΔPQR seg RS is bisector of $\angle PRQ$. $PS = 6$, $SQ = 8$, $PR = 15$.

Find QR.



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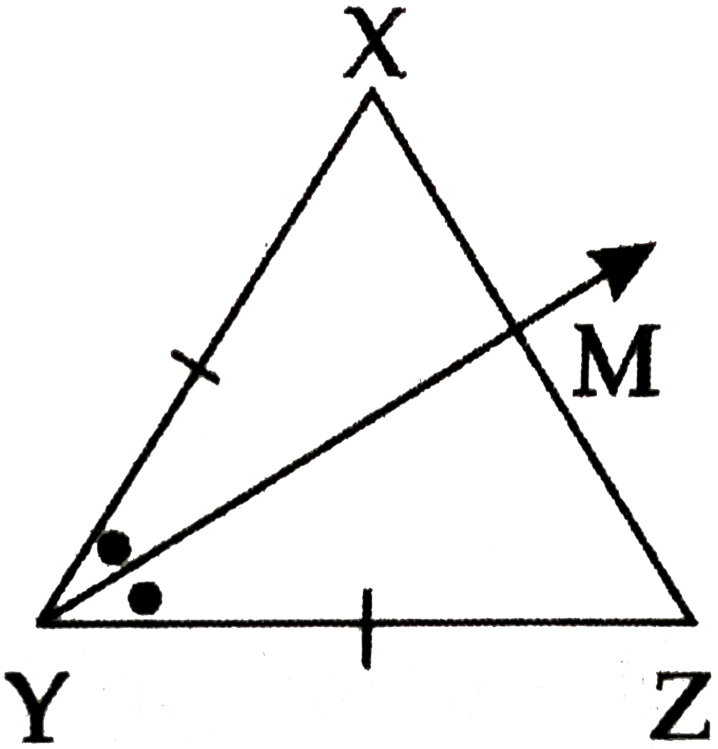
8. In $\Delta XYZ, XY = YZ$. Ray YM bisects$\angle XYZ$. $X - M - Z$ prove that M is midpoints of seg XZ.



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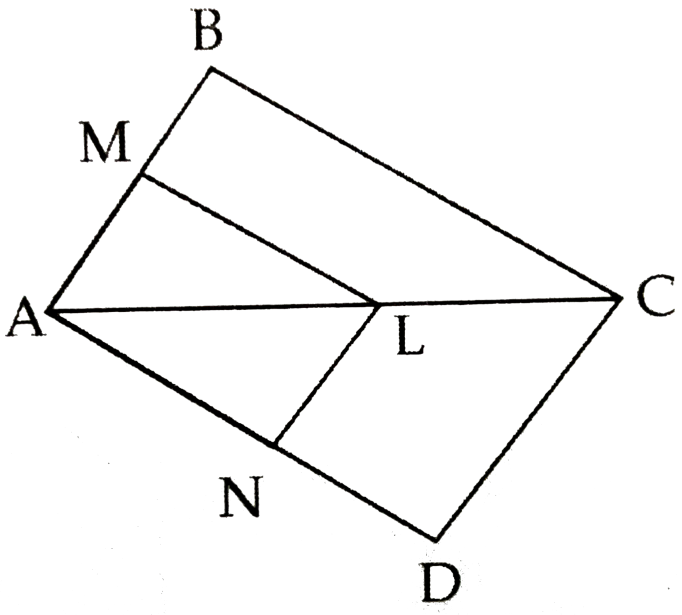
9. In the adjoining figure , seg ML || seg BC , seg NL || seg DC. Prove that

AM : AB = AN: AD .



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10. □ $ABCD$ is a trapezium in which AB|| DC and its diagonals intersect each other at points O . Show that AO : BO = CO : DO.

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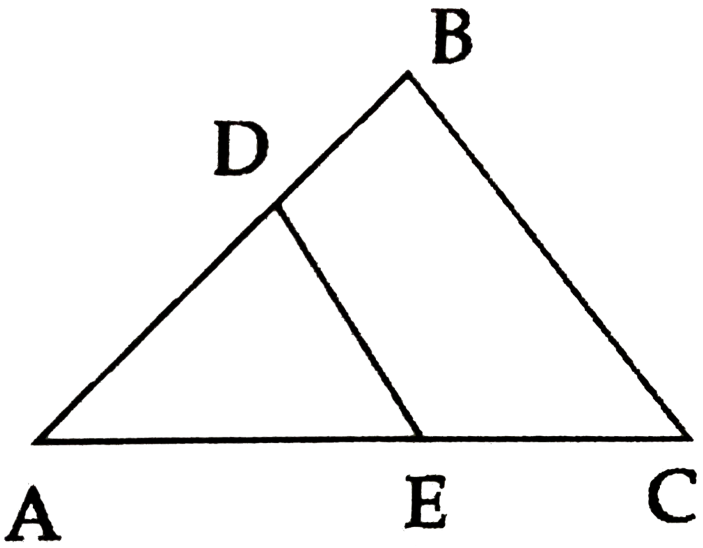
11. Point D and E are the points on sides AB and AC such athat AB = 5.6 , AD = 1.4 , AC =7.2 and AE = 1.8 . Show that DE||BC.



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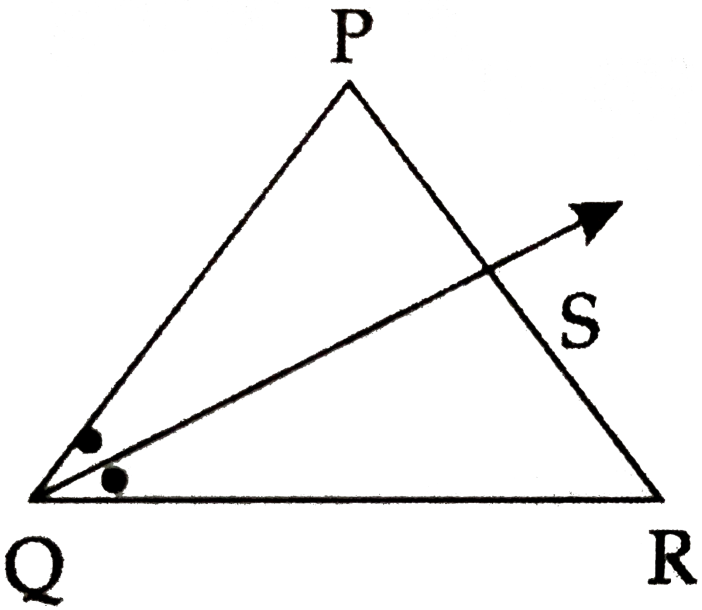
12. In ΔPQR , ray QS bisects of $\angle PQR. P - S - R.$ Show that $\frac{A(\Delta PQS)}{A(\Delta QRS)} = \frac{PQ}{QR}$



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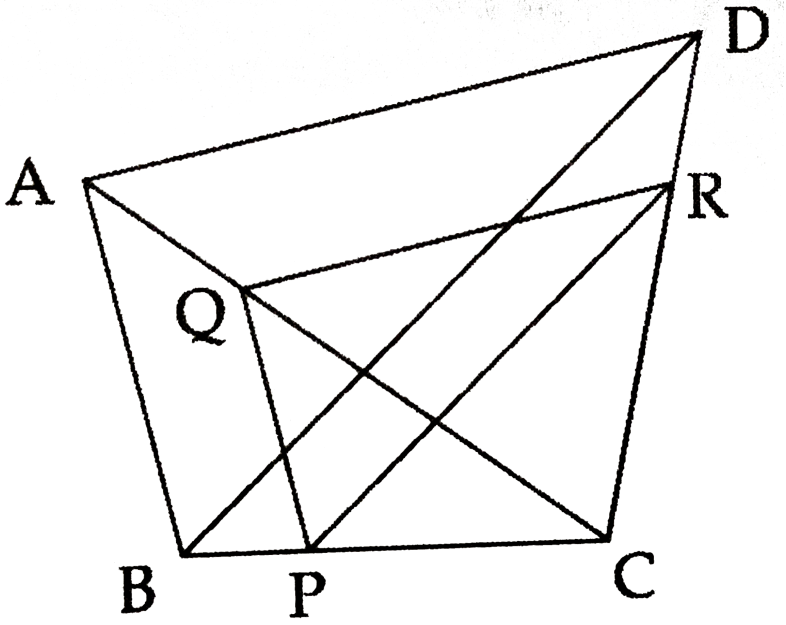
13. In the adjoining figure , seg PQ || AB. Seg PR || seg BD. Prove that QR||AD.



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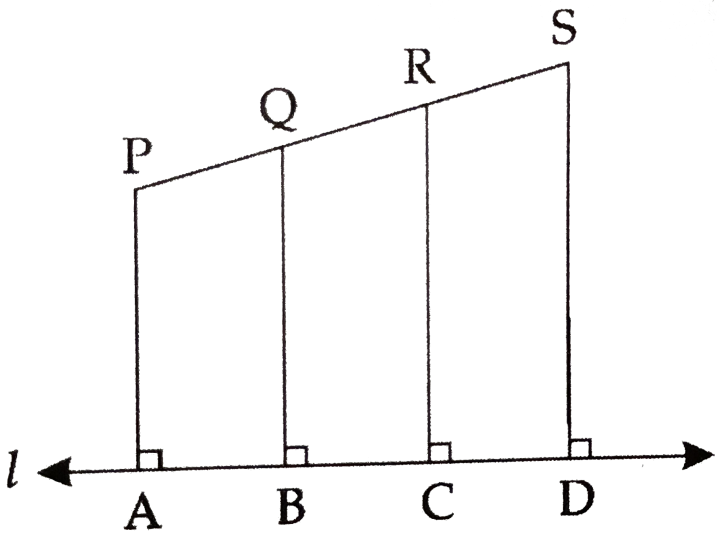
14. In the adjoining figure , seg PA, seg QB, seg , RC and seg SD are $\perp$ to line $AB = 6, BC =$

then find PQ , QR and RS .



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15. A vertical pole of a length 6 m casts a shadow of 4 m long on the ground . At the same time a tower casts a shadow 28 m long . Find the height of the tower.

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16. In ΔABC, $AB = 5$, $BC = 6$, $AC = 7$. $\Delta PQR \sim \Delta ABC$. Perimeter of ΔPQR

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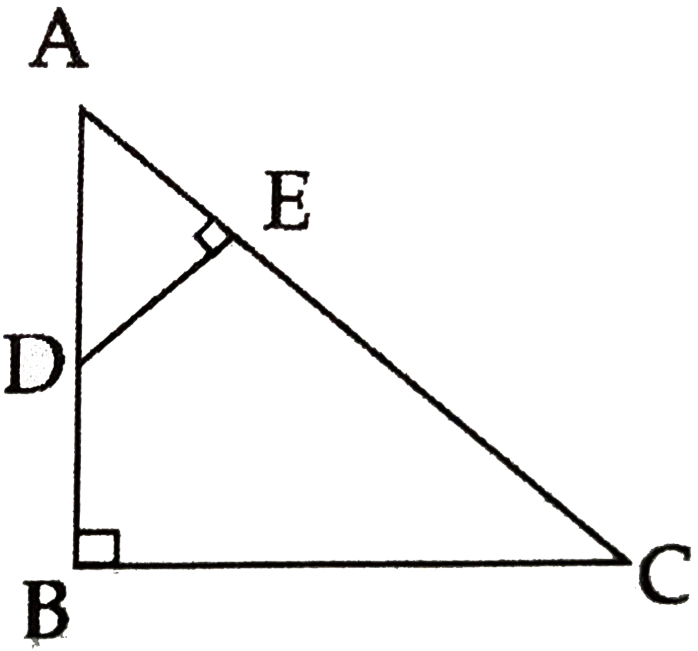
17. In ΔABC, $\angle B = 90^\circ$, seg $DE \perp$ side AC. $AD = 6$, $AB = 12$, $AC = 18$,

, then find AE.



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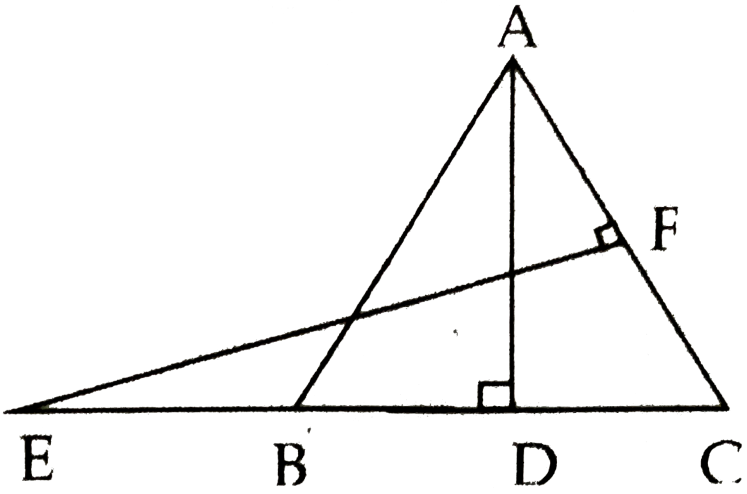
18. E is a point on side $CB, C-B-E, \text{In} \Delta ABC, AB=AC$. If seg $AD, BC, B-D-C$ and s



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19. D is a point on side BC of ΔABC such that , $\angle ADC = \angle BAC$. Show that $AC^2 = BC \times DC$.

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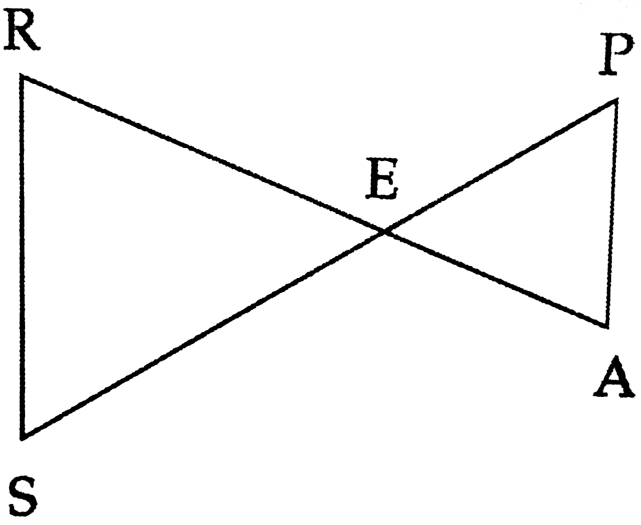
20. In

ΔRES, $RE = 15$, $SE = 10$. InΔPEA, $PE = 8$, $AE = 12$. Prove thatΔRE



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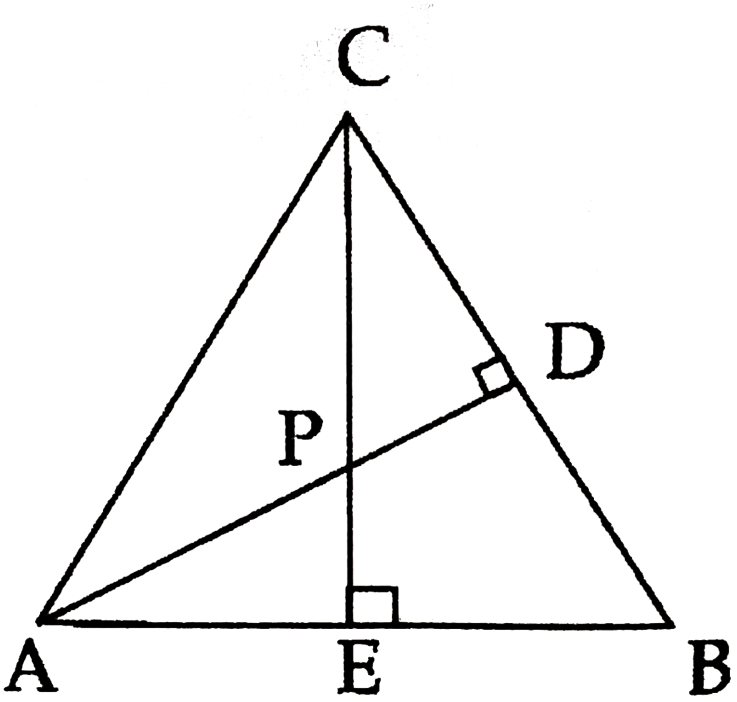
21. In the adjoining figure seg $Ce \perp$ side AB, seg$AD \perp$ side BC. Prove that

(i) ΔAEP~ΔCDP

(ii)$\Delta AEP \sim \Delta ADB$



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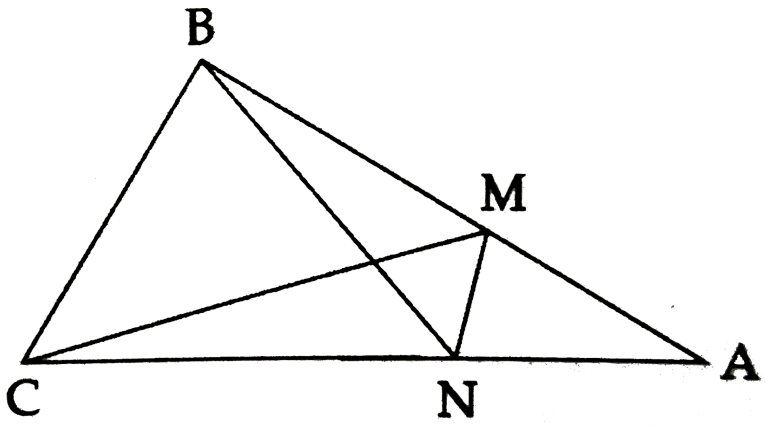
22. In the adjoining figure , if $\Delta ABN \cong \Delta ACM$ show that $\Delta AMN \sim \Delta ABC$.



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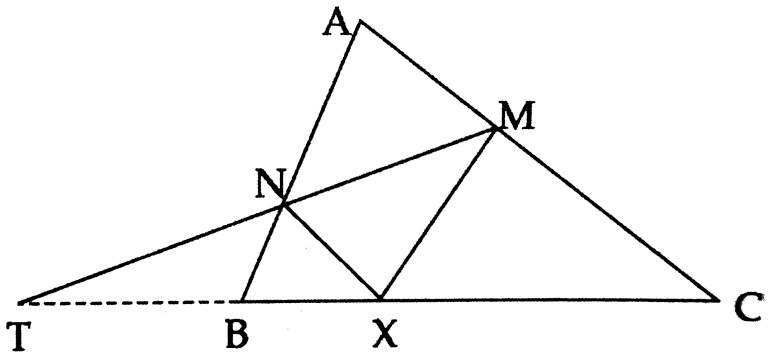
23. Let X be any point on side BC of ΔABC seg XM || side AB and seg XN ||side CA . M - N- T , T - B - X . Prove that : $TX^2 = TB.TC.$



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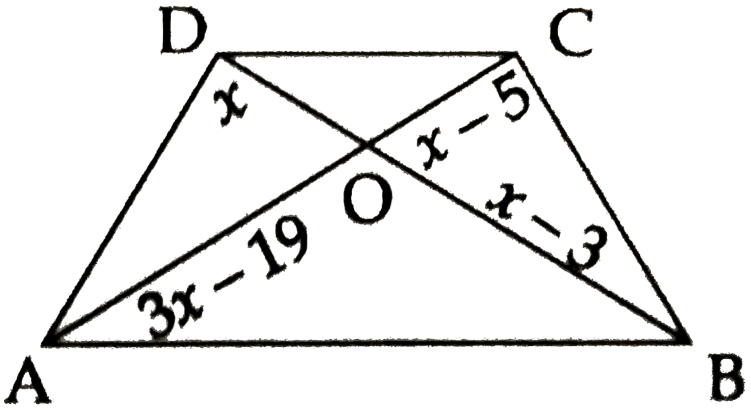
24. In the adjoining figure , seg AB || side DC , OD = x OB = x -3 , OC = x-5 , OA = 3x -19. Find the value of x .



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25. $\Delta DEF \sim \Delta MNK$ If DE = 5 and MN = 6 , then find the value of $A(\Delta DEF) : A(\Delta MNK)$

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26. If $\Delta ABC \sim \Delta DEF$ such that the area of $\Delta ABC \text{is} 9\text{cm}^2$ and the area of $\Delta DEF \text{is} 16\text{cm}^2$. If BC = 2.1 cm . Find

length of EF.

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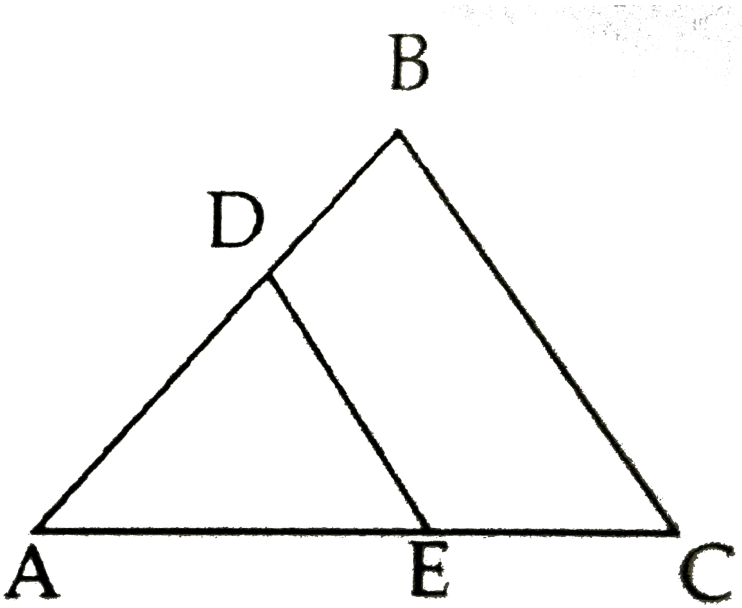
27. In the adjoining figure, seg DE|| side BC . If DE : BC =3: 5 , then find $A(\Delta ADE) : A(\Delta DBCE)$



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28. In ΔABC , PQ is a line segment intesecting AB at point P and AC at point Q. PQ || BC. If PQ divides ΔABC into two equal parts equal in area , find BP: AB .

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29. In $\Delta ABC, \angle ABC = 90^\circ$. $\Delta PAB, \Delta QAC$ and ΔRBC are the equilateral triangles contructed on sides AB , AC and BC repectively. Prove that : $A(\Delta PAB) + A(\Delta RBC) = A(\Delta QAC)$

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30. In ΔABC , seg DE|| side BC. If $2A(\Delta ADE) = A(\square DBCE)$. Show that $BC = \sqrt{3} \times DE$.

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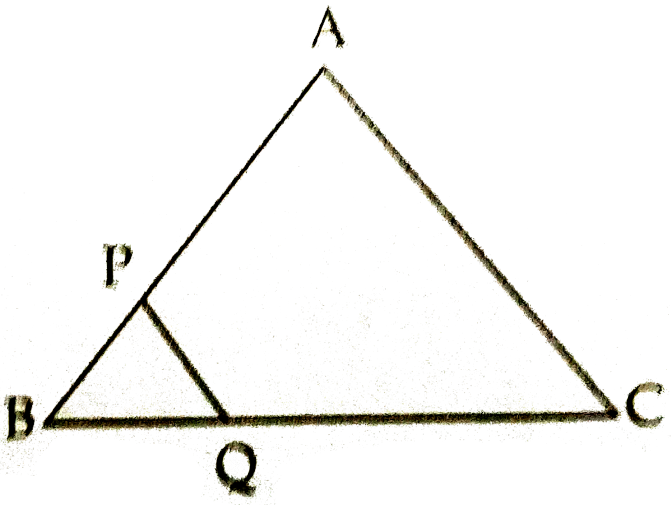
Assignment 1

1. Select the appropriate alternative : In the adjoining figure , $PQ \mid\mid AC. BP = 6, PA = 8, BQ = 9$, then QC = ...



A. 15

B. 12

C. 18

D. 20

Answer:

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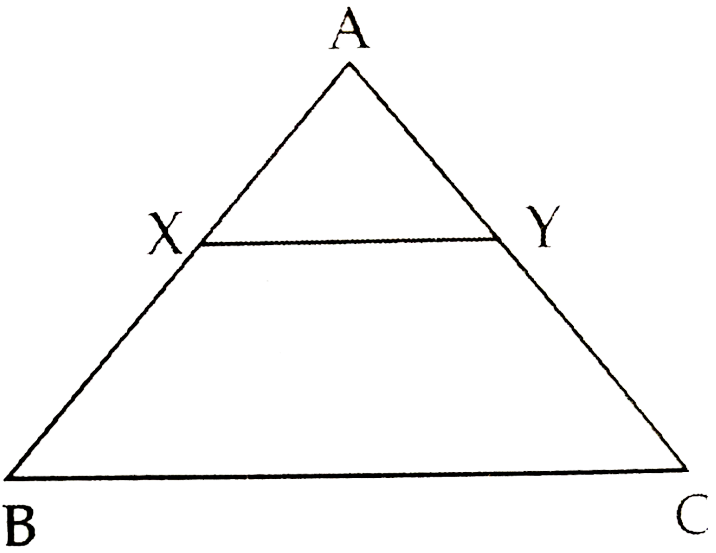
2. In the figure seg XY|| BC , then which of the following statement is true?



A. $\frac{AB}{AC} = \frac{AX}{AY}$

B. $\frac{AX}{XB} = \frac{AY}{AC}$

C. $\frac{AX}{YC} = \frac{AY}{XB}$

D. $\frac{AB}{YC} = \frac{AC}{XB}$

Answer:

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3. Solve the following questions :

$\Delta ABC \sim \Delta PQR A(\Delta ABC) : A(\Delta PQR) = 9 : 16 \text{Find} \quad BC : QR .$

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4. Solve the foloowing questions :

$\Delta PQR, \text{seg} \quad RS \quad \text{is the bisector of} \quad \angle PRQ. \; PS = 8, \; SQ = 6, \; PR = 20, \; \text{th}$

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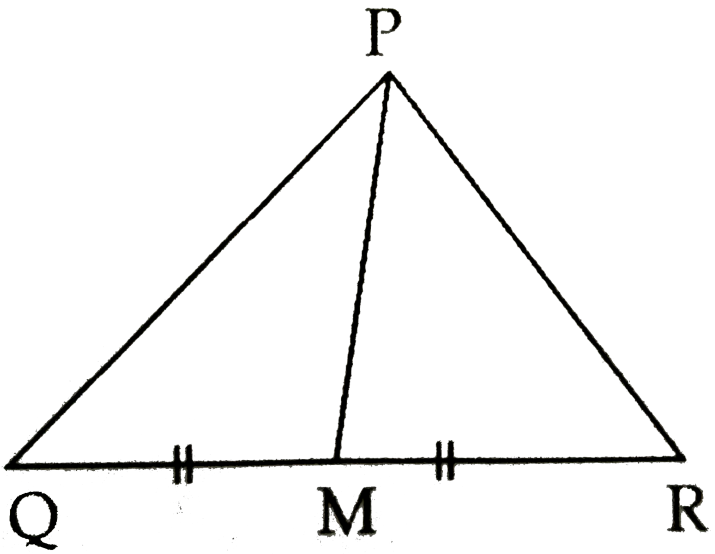
5. Perform any one the following activities:

In the adjoining figure , seg PM is a median . Prove that

$A(\Delta PQM) = A(\Delta PRM)$



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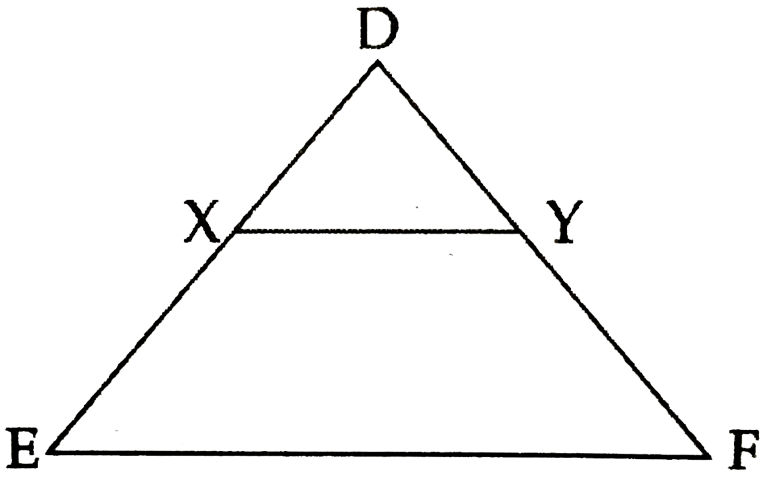
6. Perform any one the following activities:

In the adjoining figure , DX = 4 , DE = 8 , FY = 6 , OF = 12 . Complete the

follwing activity to prove that seg XY || seg EF.



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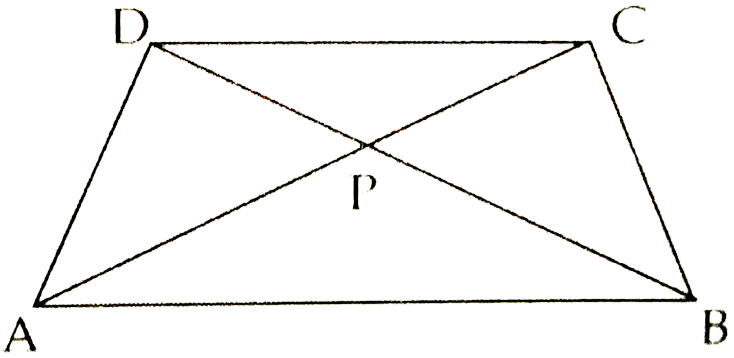
7. Attempt any Two of the following:

In $\square ABCD$,seg AB ||seg CD . Diagonal AC and BD intersect each other

at point P . Prove : $\frac{A(\Delta ABP)}{A(\Delta CPD)} = \frac{AB^2}{CD^2}$



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8. D is a point on side BC of ΔABC such that , $\angle ADC = \angle BAC$. Show that $AC^2 = BC \times DC$.

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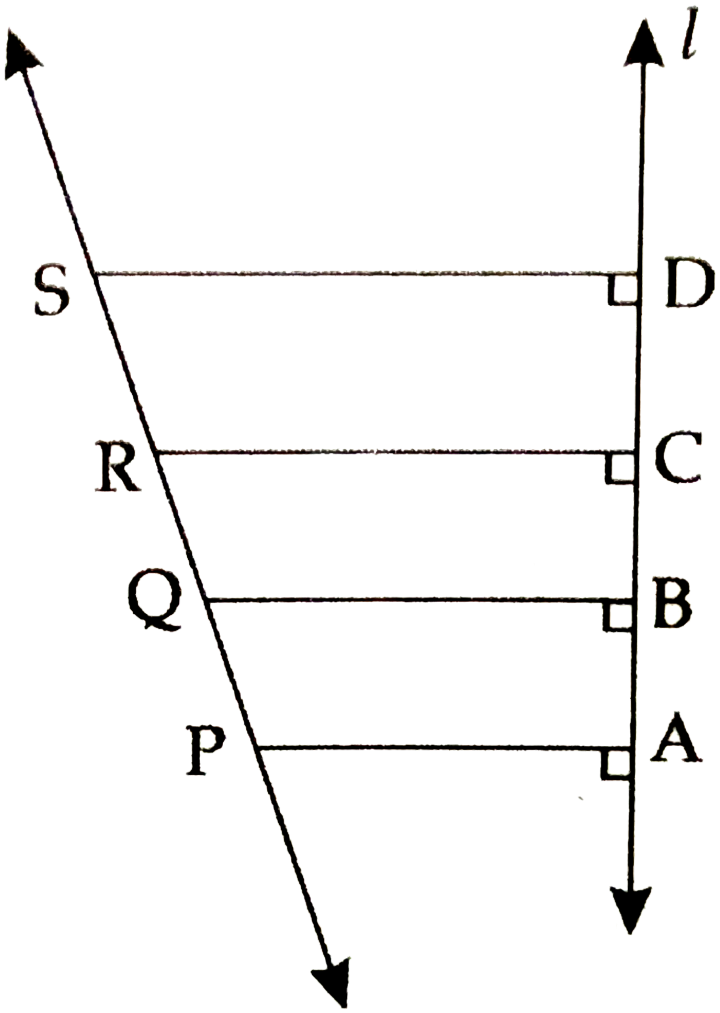
9. Attempt any Two of the following:

In the adjoining figure seg PA , seg QB seg RC and seg SD are $\perp$ line l .

AB = 60 , BC = 70 , CD = 80 . If PS = 280 ,then PQ , QR , RS .



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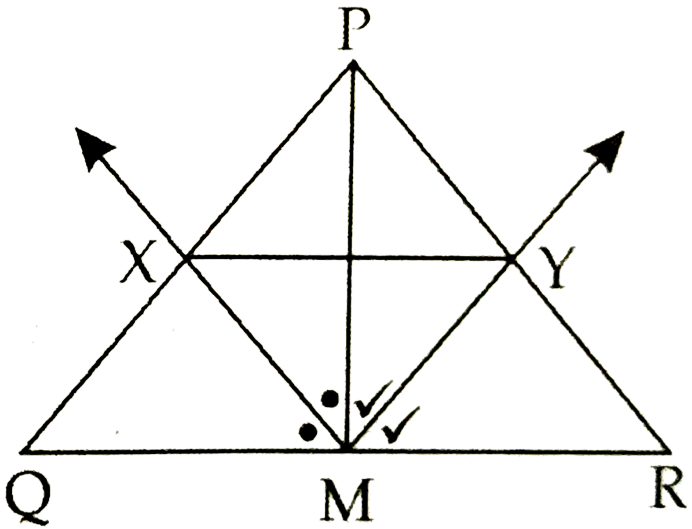
10. Atempt any two of the following :

In ΔPQR ray MX and ray MY bisect $\angle PMQ$ and $\angle PMR$ respectively .

P- X - Q , P - Y - R . Seg PM is a median , prove that seg XY || seg QR



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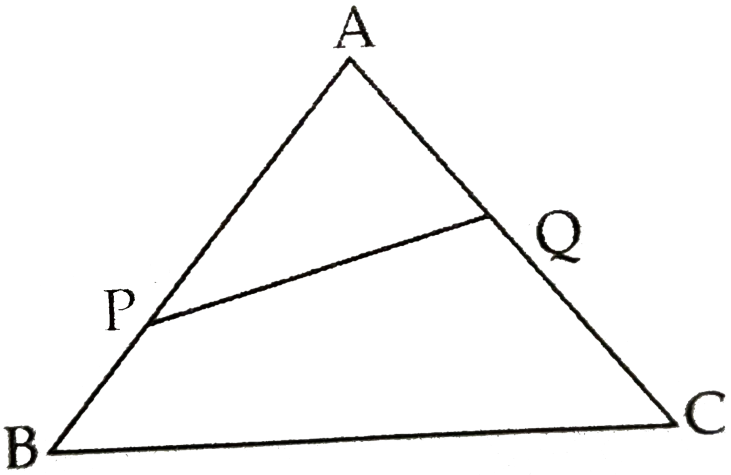
11. Atempt any two of the following :

In the adjoining figure , in the adjoining figure , in

$\Delta ABC, A-P-B$ and $A-Q-C$Prove that $\frac{A(\Delta APQ)}{A(\Delta ABC)} = \frac{AP \times A}{AB \times A}$



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12. Atempt any two of the following :

Prove : In a triangle the angle bisector divides the side opposite to the angle in the ratio of the remaining sides.

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