

VAISHALI EDUCATION POINT

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Class :- X
MATHS- TRAINGLES

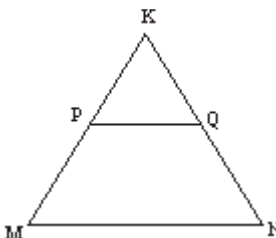
General Instructions

QNo.

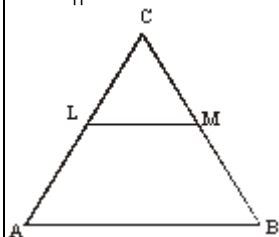
Questions

1

PQ is \parallel MN. If $\frac{KP}{PM} = \frac{4}{13}$ and KN = 20.4 cm. Find kQ.

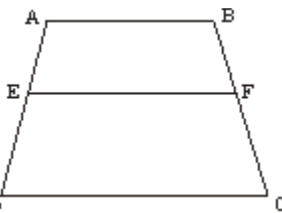


2 LM \parallel AB. If AL = x - 3, AC = 2x, BM = x - 2 and BC = 2x + 3, find the value of x.



3

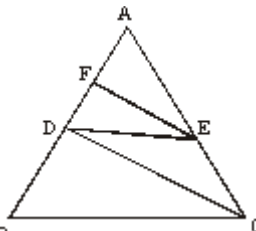
If EF \parallel DC \parallel AB. Prove that $\frac{AE}{ED} = \frac{BF}{FC}$.



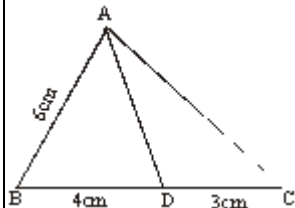
4 D and E are respectively the points on the sides AB & AC of a $\triangle ABC$ st. AB = 5.6 cm, AD = 1.4cm, AC = 7.2cm & AE = 1.8cm. Show that DE \parallel BC.

5

DE \parallel BC and CD \parallel EF. Prove that : $AD^2 = AB \times AF$.

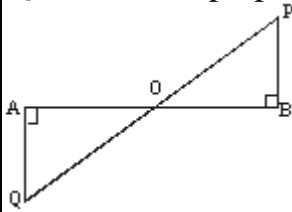


6 AD is bisector of $\angle A$. If BD = 4cm, DC = 3cm and AB = 6cm. Determine AC.



7 AD is bisector of $\angle BAC$. If AB = 10cm. AC = 14cm and BC = 6cm. Find BD and DC.

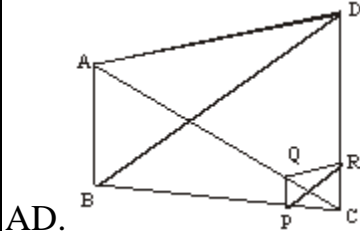
8 QA & PB are perpendiculars to AB. If AO = 10 cm, BO = 6cm & PB = 9cm. Find AQ.



9 If $\angle ADE = \angle B$. Show that $\triangle ADE \sim \triangle ABC$. If AD = 3.8cm, AE = 3.6 cm, BE = 2.1cm & BC = 4.2cm. Find DE.

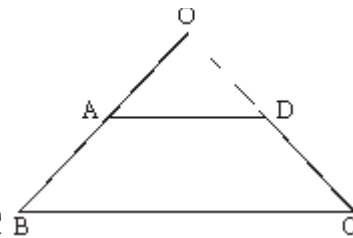


10 In quadrilateral ABCD, P is any point in side BC. PQ \parallel AB and PR \parallel BD. Show that QR \parallel



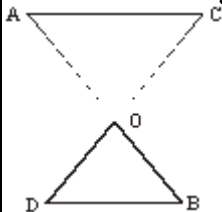
AD.

11



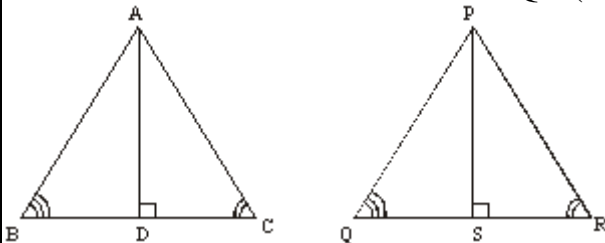
Use the given figure to find the value of x, if : AD \parallel BC (i) OA = $4x - 2$ OB = $4x + 1$ OC = $2x + 2$ OD = $3x - 1$ (ii) OA = $5x$, OB = $7x - 1$, OC = $5x + 1$ and OD = $4x$

12 In the following fig. $OA \times OB = OC \times OD$. Show that $\angle A = \angle D$ and $\angle B = \angle C$

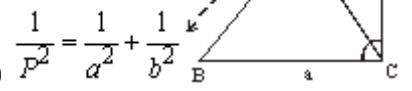


13 In $\triangle ABC$, D is a point in AB, E is a pt. in AC, DE \parallel BC. If $4AD = 5DB$. Find (i) DE; if BC = 27cm (ii) Ar. ($\triangle ADE$) : Ar. ($\triangle ABC$) (iii) Ar. ($\triangle ADE$): Ar (Trap. $\triangle BCE$)

14 Given : $\triangle ABC \sim \triangle PQR$, ($AD = BC$), ($PS = QR$) and $PS = 2AD$. Find (i) AB : PQ (ii) Perimeter of $\triangle ABC$: Perimeter $\triangle PQR$ (iii) ar. ($\triangle PQR$) :ar. ($\triangle ABC$)

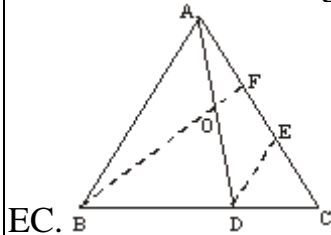


15 ABC is a right triangle, right angled at C. If P is the length of the perpendicular from C to

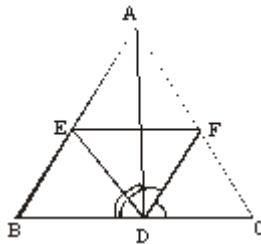


AB, AB = c, BC = a and CA = b; then prove that (i) $Pc = ab$ (ii) $\frac{1}{P^2} = \frac{1}{a^2} + \frac{1}{b^2}$

- 16 AD is median of triangle ABC, O is mid point of AD and DE || BF. Prove that : AF = FE = EC.



- 17 In Fig. base BC of a $\triangle ABC$ is bisected at D. DE & DF are bisectors of $\angle ADB$ & $\angle ADC$



respectively. Show that $EF \parallel BC$.

- 18 The bisector of the exterior angle A of a triangle ABC intersect the side BC, Produced in

D. Prove that $\frac{AB}{AC} = \frac{BD}{CD}$

- 19 Through the mid pt. M of the side CD of a ||gm ABCD the line BM is drawn intersecting AC at L and AD Produced in E. Prove that $EL = 2 BL$.

- 20 To prove three times the sum of the squares of the sides of a triangle is equal to four times the sum of the square of the medians of a triangle.

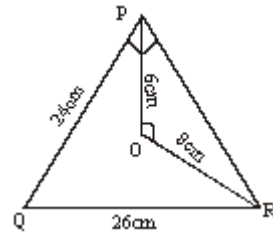
- 21 In rectangle ABCD, $AM \perp BD$ and $CN \perp BD$. Prove that : $BM^2 + BN^2 = DM^2 + DN^2$

- 22 In an Isosceles $\triangle ABC$, $AB = AC$ & D is a pt. on BC. Prove that $(AB^2 - AD^2) = BD \cdot CD$.

- 23 In a $\triangle ABC$, $\angle ABC < 90^\circ$ and $AD \perp BC$. Prove that $AC^2 = AB^2 + BC^2 - 2BC \cdot BD$.

- 24 In $\triangle ABC$, $\angle ABC > 90^\circ$ & $AD \perp CB$ (produced). Prove that $AC^2 = AB^2 + BC^2 + 2BC \cdot BD$.

- 25 In the given fig., O is a point inside a $\triangle PQR$ st. $\angle POR = 90^\circ$, $OP = 6\text{cm}$ and $OR = 8\text{cm}$. If



$PQ = 24\text{cm}$ and $QR = 26\text{cm}$. Prove that $\triangle PQR$ is right angled.

- 26 A man goes 10m due south and then 24m due west. How far is he from the starting point?

- 27 State & prove the Pythagoras theorem & its converse.

- 28 State and prove the Thales theorem and its converse.

- 29 Prove that the ratio of the area of 2 similar \triangle s is equal to the ratio of the squares of their (i) corresponding altitudes (ii) corresponding medians (iii) corresponding angle bisector

segments.

- 30 In fig, DE is parallel to BC. If $\frac{AD}{DB} = \frac{3}{2}$ and AE = 4.8 cm, find EC.



- 31 In fig, DE \parallel BC. If AD = 2.4 cm, DB = 3.6 cm and AC = 5 cm, find AE.



- 32 In fig, If DE \parallel BC and AD = 4x - 3, AE = 8x - 7, BD = 3x - 1 and CE = 5x - 3, find x.



- 33 In fig, AB is parallel to CD. If OA = 3x - 19, OB = x - 4, OC = x - 3 and OD = 4, determine x.



- 34 Show that a line drawn parallel to the parallel sides of a trapezium divides the non-parallel sides proportionally.

- 35 In fig, $\angle A = \angle B$ and AD = BE. Show that DE \parallel AB.



- 36 In triangle ABC, D and E are two points lying on side AB such that AD = BE. If DP \parallel BC and EQ \parallel AC, then prove that PQ \parallel AB.

- 37 In fig, DE \parallel AB and FE \parallel DB, Prove that $DC^2 = CF.AC$.



- 38 If a line is drawn parallel to one side of a triangle, to intersect the other two sides in distinct points, prove that the other two sides are divided in the same ratio.

Using the above result solve the following questions

(i) Find AB when in $\triangle ABC$, DE \parallel BC so that AD = 2.4 cm, AE = 3.2 cm, and EC = 4.8 cm.

(ii) In fig, DE is parallel to base BC. If AD = 2.5 cm, BD = 3.0 cm and AE = 3.75 cm, find the length of AC.



(iii) In fig, DE \parallel BC and BD = CE. Prove that ABC is an isosceles triangle.



(iv) Prove that DE \parallel AB, if AD = BE and $\angle A = \angle B$.



(v) Using the above, do the following:

In $\triangle ABC$, DE is parallel to base BC, with D on AB and E on AC. If $\frac{AD}{DB} = \frac{2}{3}$, find $\frac{BC}{DE}$.

(vi) Using the above, prove the following:

In fig, AB \parallel DE and BC \parallel EF. Prove that AC \parallel DF.



(vii) Using the above result prove the following: In fig, If ABCD is a trapezium in which

$AB \parallel DC \parallel EF$, then $\frac{AE}{ED} = \frac{BF}{FC}$



(viii) Using the above result, prove the following The diagonals of a trapezium divide each other in the same ratio.

- 39 In fig, P and Q are points on the sides AB and AC respectively of ΔABC such that $AP = 3.5$ cm, $PB = 7$ cm, $AQ = 3$ cm and $QC = 6$ cm. If $PQ = 4.5$ cm, find BC.



- 40 In a ΔABC , $AB = AC$ and D is a point on side AC, such that $BC^2 = AC \times CD$. Prove that $BD = BC$.

- 41 In fig. $\Delta ABC \sim \Delta LMN \sim \Delta KNP$. Express x in terms of a, b and c where a, b and c are lengths of LM, MN and NK respectively.



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

- 43 E is a point on the side AD produced of a $\parallel gm$ ABCD and BE intersects CD at F. Show that $\Delta ABE = \Delta CFB$

- 44 In fig. $AC \parallel BD$. Is $\frac{AE}{CE} = \frac{DE}{BE}$? Justify your answer.



- 45 In fig, considering triangles BEP and CPD, prove that $BP \times PD = EP \times PC$.



- 46 Two right triangles ABC and DBC are drawn on the same hypotenuse BC and on the same side of BC. If AC and BD intersect at P, prove that $AP \times PC = BP \times PD$.

- 47 In fig the diagonal BD of a parallelogram ABCD intersects the segments AE at F, where E is any point on the side BC. Prove that $DF \times EF = BF \times AF$.



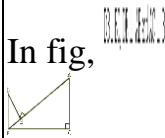
- 48 In ΔABC , $\angle A$ is acute, BD and CE are perpendiculars on AC and AB respectively. Prove that $AB \times AE = AC \times AD$.

- 49 In fig., $DE \parallel BC$, $AD = 2$ cm, $BD = 2.5$ cm, $AE = 3.2$ cm and $DE = 4$ cm. Determine AC and BC.



- 50 In fig, ABCD is a trapezium in which AB is parallel to DC. If AC trisects BD, then prove that $CD = \frac{1}{2} AB$.

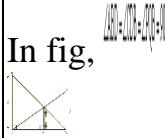


51 In fig, . Prove that $\frac{BE}{DE} = \frac{AC}{BC}$.

52 In fig, DEFG is a square and $\angle BAC = 90^\circ$. Show that $DE^2 = BD \times EC$.



53 Through the mid-point M of the side CD of a parallelogram ABCD, the line BM is drawn intersecting AC in L and AD produced to E. Prove that $EL = 2 BL$.

54 In fig, . If $AB = x$ units, $CD = y$ units and $PQ = z$ units, prove that $\frac{1}{x} + \frac{1}{y} = \frac{1}{z}$.



55 The perimeters of two similar triangles ABC and PQR are respectively 32 cm and 24 cm. If $PQ = 12$ cm, find AB.

56 In fig, $PQ \parallel BC$ and $AP : PB = 1 : 2$. Find $\frac{\text{ar}(\triangle APQ)}{\text{ar}(\triangle ABC)}$.



57 D, E and F are the mid-points of the sides BC, AC and AB respectively of $\triangle ABC$. Find $\frac{\text{ar}(\triangle DEF)}{\text{ar}(\triangle ABC)}$.

58 In fig, $ST \parallel QR$, $PS = 2$ cm and $SQ = 3$ cm. What is the ratio of the area of $\triangle PQR$ to the area of $\triangle PST$?



59 In fig, $\triangle ABC$ are similar, $BC = 3$ cm, $EF = 4$ cm and area of $\triangle ABC = 54$ sq. cm. Determine the area of $\triangle DEF$.



60 In fig, $\triangle ABC$ and $\triangle PQR$. Also $\text{ar}(\triangle ABC) = 4\text{ar}(\triangle PQR)$. If $BC = 12$ cm, find QR.



61 The area of two similar triangles are 121 cm^2 and 64 cm^2 respectively. If the median of the first triangle is 12.1 cm, find the corresponding median of the other.

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

63 D and E are points on the sides AB and AC respectively of $\triangle ABC$ such that DE is parallel to BC, and $AD : DB = 4 : 5$. CD and BE intersect each other at F. Find the ratio of the areas of $\triangle DEF$ and $\triangle BCF$.

64 In fig, $\frac{XP}{PY} = \frac{XQ}{QZ} = 3$. If the area of $\triangle XYZ$ is 32 cm^2 , then find the area of the quadrilateral PYZQ.

