



MATHS

BOOKS - CHETANA MATHS (MARATHI ENGLISH)

SIMILARITY

Example

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

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2. Ratio of areas of two triangles with equal height is 2:3. If base of smaller triangle is 6 cm then find the corresponding base of the bigger triangle.

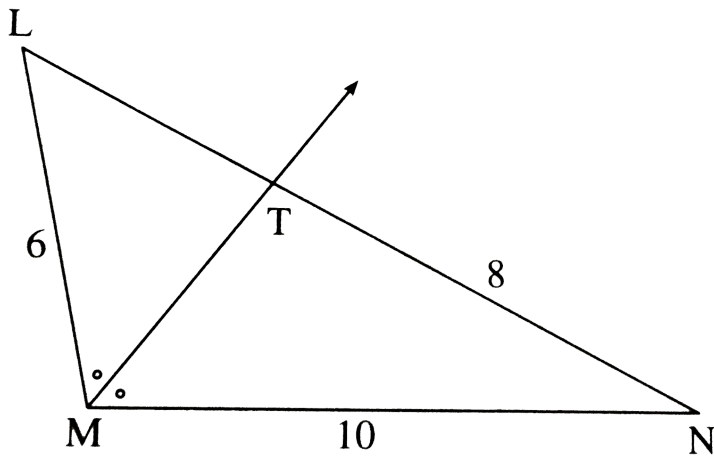
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3. In $\triangle MNP$, NQ is a bisector of $\angle N$. If $MN = 5$, $PN = 7$, $MQ = 2.5$, then find QP .

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4. In $\triangle LMN$, ray MT bisects $\angle LMN$. If $LM = 6$, $MN = 10$.

$TN = 8$ then find LT .

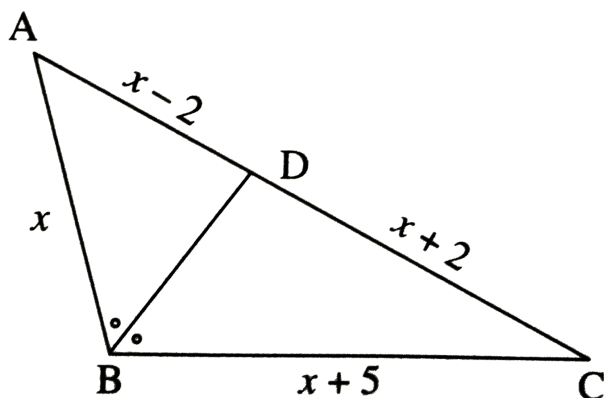


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5. In $\triangle ABC$ Seg BD bisects $\angle ABC$. If

$$AB = x, BC = x + 5, AD = x - 2, DC = x + 2,$$

then find the value of x .



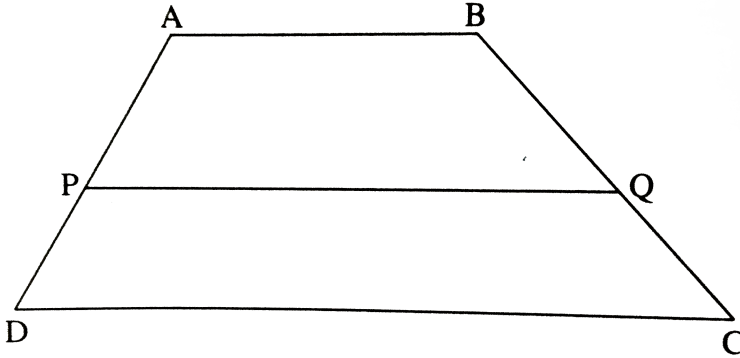
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6. In $\triangle ABC$, ray BD bisects $\angle ABC$ and ray CE bisects $\angle ACB$.

If $\text{seg } AB \cong \text{seg } AC$, then prove that $ED \parallel BC$.

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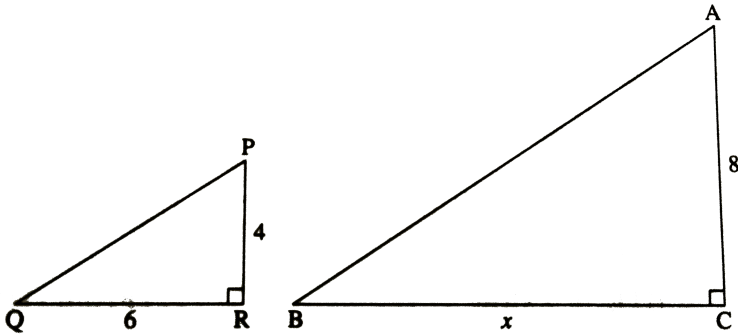
7. In trapezium ABCD side $AB \parallel PQ \parallel DC$,
 $AP = 15$, $PD = 12$, $QC = 14$, find BQ.



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8. As shown in the figures, two poles of height 8m and 4m are perpendicular to the ground. If the length of shadow smaller pole due to sunlight is 6 m then long will be the shadow of the bigger

pole of the same time?



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9. In trapezium $PQRS$, $PQ \parallel SR$. A is intersection point of diagonals. $AR = 5AP$ and $AS = 5AQ$. Prove that $SR = 5PQ$

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10. $\square ABCD$ 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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11. If $\triangle ABC \sim \triangle PQR$ and $AB:PQ = 2:3$, then find x and y .
$$\frac{A(\triangle ABC)}{A(\triangle PQR)} = \frac{x}{PQ^2} = \frac{4}{y}$$

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12. Ratio of corresponding sides of two similar triangles is 3:5, then find ratio of their areas.

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13. If

$$\triangle ABC \sim \triangle PQR, A(\triangle ABC) = 841, A(\triangle PQR) = 625$$

, then $\frac{AB}{PQ} = ?$

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14. $\triangle PQR \sim \triangle LMN, A(\triangle PQR) = 16,$

$A(\triangle LMN) = 9.$ If $QR = 20$ then find MN .

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15. Areas two similar triangles are 225 sq.cm, 81 sq.cm. If a side of the smaller triangle is 12 cm, then find

corresponding side of bigger triangle.

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16. $\triangle ABC$ and $\triangle DEF$ both are equilateral triangles.

$A(\triangle ABC) : A(\triangle DEF) = 1:2$. If $AB = 4$, then what is the length of DE ? a) $4\sqrt{2}$ b) 8 c) 4 d) 2

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Exercise

1. If in $\triangle ABC$ and $\triangle PQR$ for some one-one correspondence if $\frac{AB}{QR} = \frac{BC}{PR} = \frac{CA}{PQ}$ then: a)

$$\triangle PQR \sim \triangle ABC$$

$$\text{b) } \triangle PQR \sim \triangle CAB$$

c)

$$\triangle CBA \sim \triangle PQR \text{ d) } \triangle BCA \sim \triangle PQR$$

A. $\triangle PQR \sim \triangle ABC$

B. $\triangle PQR \sim \triangle CAB$

C. $\triangle CBA \sim \triangle PQR$

D. $\triangle BCA \sim \triangle PQR$

Answer:



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2. If in $\triangle DEF$ and $\triangle PQR$, $\angle D \cong \angle Q$, $\angle E \cong \angle R$,

then which of the following statement is false? a) $\frac{DE}{PQ} =$

$\frac{DE}{QR}$ b) $\frac{DF}{QP} = \frac{EF}{RP}$ c) $\frac{EF}{RP} = \frac{DE}{QR}$ d) $\frac{DE}{QR} = \frac{DF}{QP}$

$$\text{A. } E \frac{F}{P} R = D \frac{F}{P} Q$$

$$\text{B. } D \frac{E}{P} Q = E \frac{F}{R} P$$

$$\text{C. } D \frac{E}{Q} R = D \frac{F}{P} Q$$

$$\text{D. } E \frac{F}{R} P = D \frac{E}{Q} R$$

Answer:



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3. In $\triangle ABC$ and $\triangle DEF$, $\angle B \cong \angle E$, $\angle F \cong \angle C$ and $AB = 3DE$, then which statement regarding two triangles is true? a) Triangles are not congruent and not similar
b) Triangles are similar but not congruent c) Triangles are congruent and similar d) None of these

- 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:



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4. $\triangle DEF \sim \triangle MNK$, if $DE=5$ and $MN=6$, then find the value of $A(\triangle DEF) : A(\triangle MNK)$.

A. $2\sqrt{2}$

B. 4

C. 8

D. $4\sqrt{2}$

Answer:

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5. Triangle ABC is such that, $AB=3$ cm, $BC=2$ cm and $AC=2.5$ cm. Triangle $DEF \sim$ Triangle ABC. If $EF=4$ cm, then the perimeter of Triangle DEF?

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6. The side of two similar triangles are 4:9. What is the ratio of their area?

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7. The areas of two similar triangles 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

A. 3: 4

B. 4: 3

C. 9: 16

D. 16: 9

Answer:



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8.

$$\triangle ABC \sim \triangle PQR,$$

$AB = 6\text{cm}$, $BC = 8\text{cm}$, $CA = 10\text{cm}$ and $QR = 6\text{cm}$.

What is the length of side PR in cm ? a)8 b)10 c)4.5 d)7.5

A. 8 cm

B. 10 cm

C. 4.5 cm

D. 7.5 cm

Answer:



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9. In $\triangle XYZ$, ray YM is the bisector of $\angle XYZ$ 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 of these

A. $XM = MZ$

B. $XM \neq MZ$

C. $XM > MZ$

D. None

Answer:



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10. In $\triangle ABC$, $AB=6$ cm, $BC=8$ cm and $AC=10$ cm. $\triangle ABC$ is enlarged to $\triangle PQR$ such that the largest side is 12.5 cm. What is the length of the smallest side of $\triangle PQR$? a) 7.5cm b) 9cm c) 8cm d) 10cm

A. 7.5 cm

B. 9 cm

C. 8 cm

D. 10 cm

Answer:



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11. In $\triangle ABC$, $B - D - C$ and $BD=6$ cm, $DC=4$ cm. What is

$A(\triangle ABC) : A(\triangle ACD)$? a) 2:3 b) 5:2 c) 3:2 d) 5:3

A. 2:3

B. 5:2

C. 3:2

D. 5:3

Answer:



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

$XQ = 4.8\text{cm}$, then what is XZ ? a)15.6cm b)20.4cm

c)7.8cm d)10.2cm

A. 15.6 cm

B. 20.4 cm

C. 7.8 cm

D. 10.2 cm

Answer:



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13. In $\triangle ABC$, P is a point on side BC such that $BP=4$ cm

and $PC=7$ cm. $A(\triangle APC) : A(\triangle ABC) = \dots$ a)11:7 b)7:11

c)4:7 d)7:4

A. 11:7

B. 7:11

C. 4:7

D. 7:4

Answer:



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14. In $\triangle PQR$, seg RS is the bisector of $\angle PRQ$, PS=8,

SQ=6, PR=20, then QR=.....a)10 b)15 c)30 d)40

A. 10

B. 15

C. 30

D. 40

Answer:

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15. In $\triangle ABC, l \in ePQ \parallel \parallel \text{side } BC, AP=3, BP=6, AQ=5$ then the value of QC is.....

A. 20

B. 10

C. 5

D. 16

Answer:

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16. The ratio of the areas of two triangles with the common base is 6:5. Height of the larger triangle is 9 cm. Find the corresponding height of the smaller triangle.

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17. In $\triangle RTK$, P is a point on RK such that $R-P-K$.
 $RP:PK=3:2$, then find the value of
 $A(\triangle TRP) : A(\triangle TPK)$

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18. In $\triangle RTK$, P is a point on RK such that $R-P-K$.
 $RP:PK=3:2$, then find the value of
 $A(\triangle TRK):A(\triangle TPK)$

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19. In $\triangle RTK$, P is a point on RK such that $R-P-K$.
 $RP:PK=3:2$, then find the value of
 $A(\triangle TRP):A(\triangle TRK)$

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20. 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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21. In $\triangle DEF$, line $PQ \parallel$ side EF such that $D-P-E$ and $D-Q-F$.
 $DQ=1.8$, $QF=5.4$, $PE=7.2$. Find DE .

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22. In $\triangle PQR$, seg RS is bisector of $\angle PRQ$. $PS=6$, $SQ=8$,
 $PR=15$. Find QR .

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23. In $\triangle XYZ$, $XY=YZ$. Ray YM bisects $\angle XYZ$. $X-M-Z$. Prove that M is midpoint of XZ .

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24. $\square ABCD$ is a trapezium in which $AB \parallel DC$ and its diagonals intersect each other at point O . Show that $AO:BO = CO:DO$.

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25. In $\triangle ABC$, point D and E are the points on sides AB and AC such that $AB=5.6$, $AD=1.4$, $AC=7.2$ and $AE=1.8$. Show that $DE \parallel BC$.



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26. In $\triangle PQR$, ray QS bisects of $\angle PQR$. P-S-R. Show that

$$\frac{A(\triangle PQS)}{A(\triangle QRS)} = \frac{PQ}{QR}.$$

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27. 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 28m long. Find the height of the tower.

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28. In $\triangle ABC$, $AB=5$, $BC=6$, $AC=7$. $\triangle PQR \sim \triangle ABC$.

Perimeter of $\triangle PQR$ is 360. Find PQ , QR and PR .

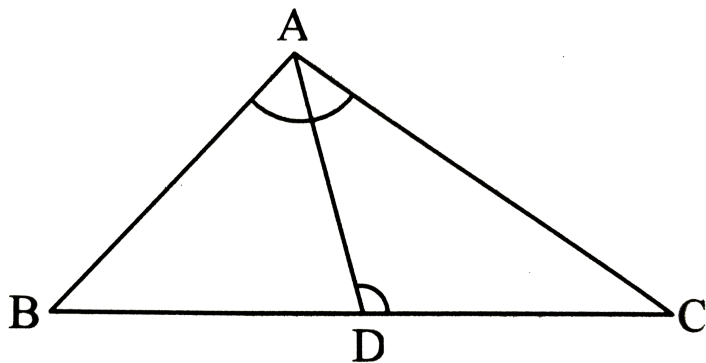
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29. In $\triangle ABC$, $\angle B = 90^\circ$, $segDE \perp sideAC$ such that $A-D-B$ and $A-E-C$. $AD=6$, $AB=12$, $AC=18$, then find AE .

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30. In the adjoining figure, in $\triangle ABC$, point D is on side BC such that, $\angle BAC = \angle ADC$. Prove that,

$$CA^2 = CB \times CD.$$



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31. In $\triangle ABC$, points D and E are on sides BC and AB such that AD and CE intersect at point P. $CE \perp AB$, $AD \perp BC$.

Prove that $\triangle AEP \sim \triangle CDP$

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32. In $\triangle ABC$, points D and E are on sides BC and AB such that AD and CE intersect at point P. $CE \perp AB$, $AD \perp BC$.

Prove that $\triangle AEP \sim \triangle ADB$

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33. In $\triangle ABC$, M and N are points on sides AB and AC respectively. $\triangle ABN \cong \triangle ACM$, show that

$\triangle AMN \sim \triangle ABC$

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34. $\triangle DEF \sim \triangle MNK$, if $DE=5$ and $MN=6$, then find the value of $A(\triangle DEF) : A(\triangle MNK)$.

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35. If $\triangle ABC \sim \triangle DEF$ such that the area of $\triangle ABC$ is 9cm^2 and the area of $\triangle DEF$ is 16cm^2 . If $BC=2.1$ cm, find the length of EF .

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36. In $\triangle ABC$, points D and E are on sides AB and AC such that $A-D-B$ and $A-E-C$. $DE \parallel BC$. If $DE:BC = 3:5$, then find $A(\triangle ADE):A(\square DBCE)$

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37. In $\triangle ABC$, PQ is a line segment intersecting AB at point P and AC at point Q such that $PQ \parallel BC$. If PQ divides $\triangle ABC$ into two equal parts equal in area. find $BP:AB$.

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38. In $\triangle ABC$, $\angle ABC = 90^\circ$.

$\triangle PAB$, $\triangle QAC$ and $\triangle RBC$ are the equilateral triangles constructed on side AB , AC and BC respectively.

Prove that: $A(\triangle PAB) + A(\triangle RBC) = A(\triangle QAC)$

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39. In $\triangle ABC$, P and Q lie on sides AB and BC such that $PQ \parallel AC$. BP=6, PA=8, BQ=9, then QC=.....a)15 b)12 c)18 d)20

A. 15

B. 12

C. 18

D. 20

Answer:

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40. In $\triangle ABC$, points X and Y lie on AB and AC such that $XY \parallel BC$, then which of the following statement is true? a)

$$\frac{AB}{AC} = \frac{AX}{AY}$$
$$\frac{AB}{YC} = \frac{AV}{XB}$$

$$\text{b) } \frac{AX}{XB} = \frac{AY}{AC}$$

$$\text{c) } \frac{AX}{YC} = \frac{AY}{XB} \quad \text{d) }$$

$$\text{A. } A \frac{B}{A} C = A \frac{X}{A} Y$$

$$\text{B. } A \frac{X}{X} B = A \frac{Y}{A} C$$

$$\text{C. } A \frac{X}{Y} C = A \frac{Y}{X} B$$

$$\text{D. } A \frac{B}{Y} C = A \frac{C}{X} B$$

Answer:



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41.

$\triangle ABC \sim \triangle PQR$.

$A(\triangle ABC) : A(\triangle PQR) = 9 : 16$. Find $BC : QR$. a) $\frac{3}{4}$

b) $\frac{4}{3}$ c) $\frac{9}{16}$ d) $\frac{16}{9}$

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42. In $\triangle PQR$, seg RS is the bisector of $\angle PRQ$, PS=8, SQ=6, PR=20, then QR=.....a)10 b)15 c)30 d)40

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43. In $\triangle PQR$, PM is a median and Q-M-R. Prove that $A(\triangle PQM) = A(\triangle PRM)$.

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44. In $\triangle DEF$, DX=4, DE=8, FY=6, DF=12 where X and Y lie on DE and DF respectively such that D-X-E and D-Y-F. Prove

that $XY \parallel EF$.

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45. In $\square ABCD$, $AB \parallel CD$. Diagonals AC and BD intersect each other at point P . Prove that $A(\triangle ABP) : A(\triangle CPD) = (AB)^2 : (CD)^2$.

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

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47. 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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