MATHS

BOOKS - ICSE

PYTHAGORAS THEORAM

Exercise 13 A

1. A ladder 13 m long rests against a vertical wall. If the foot of the ladder is 5 m from the foot of the wall, find the distance of the other end of the ladder from the ground.

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

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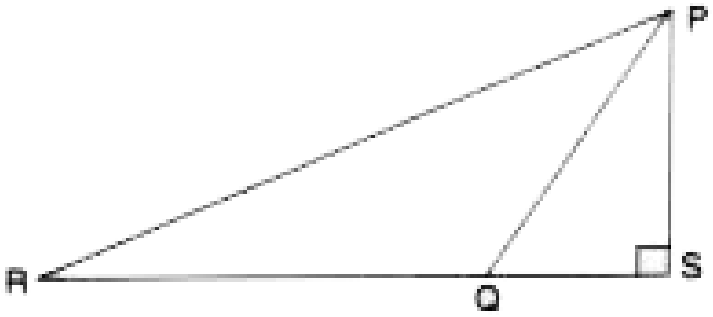
3. In the figure: $\angle PSQ = 90^\circ$, $PQ = 10cm$, $QS = 6cm$and $RQ = 9cm$. Find the value of PR.



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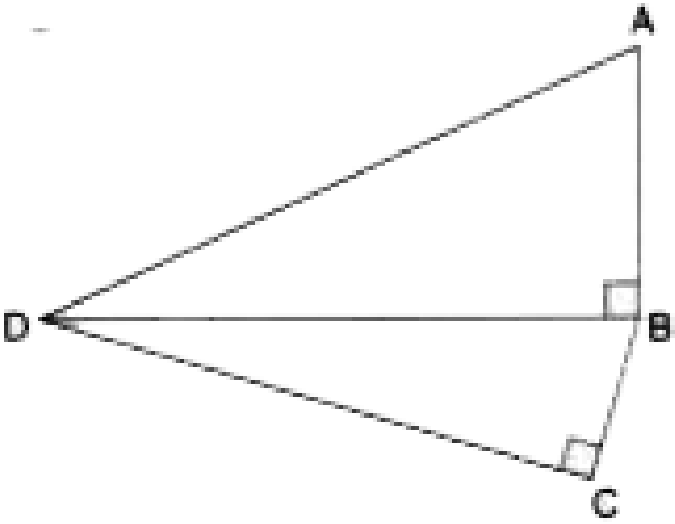
4. The given figure shows a quadrilateral ABCD in which AD =13 cm, DC= 12 cm, BC=3 cm and $\angle ABC = \angle BCD = 90^\circ$. Calculate the length of AB.



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5. AD is draw perendicular to base BC of an equilateral triangle ABC. Given BC=10 cm find the length of AD, correct to 1 place of decimal.

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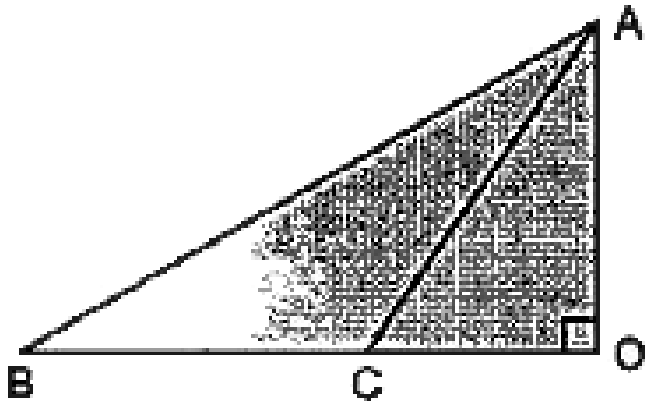
6. In triangle ABC, given below, AB = 8 cm, BC = 6 cm and AC = 3 cm. Calculate the length of OC



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7. In ΔABC, $AB = AC = x$, $BC = 10cm$ and the area of triangle is 60 cm^2. Find x.

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8. If the sides of a triangle are in the ratio $1 : \sqrt{2} : 1$, show that it is a right-angled triangle.

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

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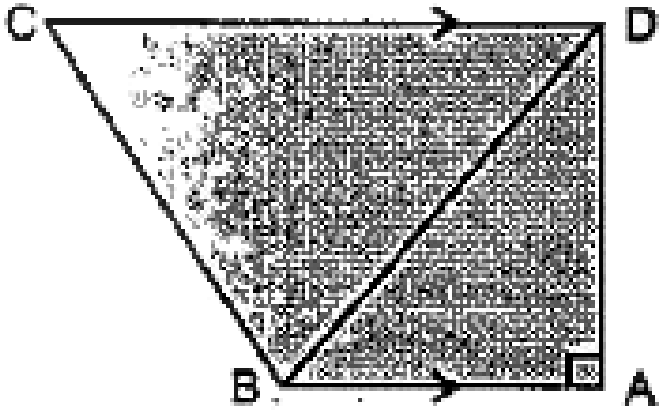
10. In the given figure, $AB \| CD, AB = 7cm, BD = 25cm$ and $CD = 17cm$, find the length of side BC.



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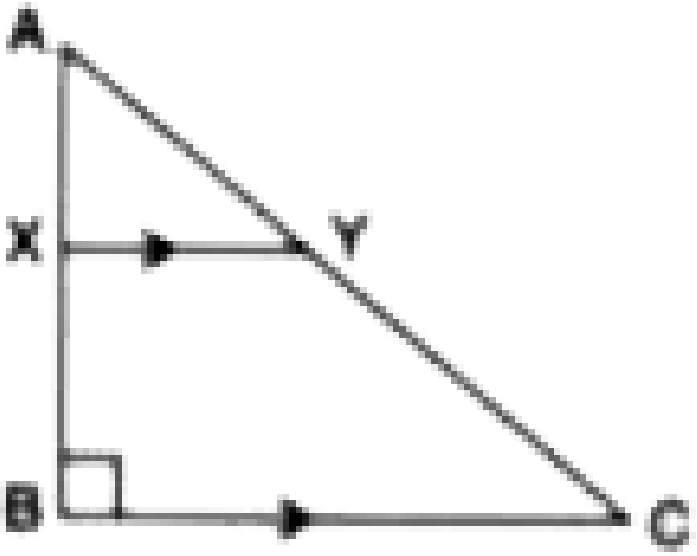
11. In th given figure,

$\angle B = 90^\circ, XY//BC, AB = 12cm, AY = 8cm$ and $AX : XB = 1 : 2 =$

. Find the lenghts of C and BC.



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12. In $\triangle ABC, \angle B = 90^\circ$. Find the sides of the triangle if:

$AB = (x - 3)cm, BC = (x + 4)cm$ and $AC = (x + 6)cm.$

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13. In ΔABC, $\angle B = 90^\circ$, find the sides of the triangle, if :

(i) $AB = (x - 3)cm$, $BC = (x + 4)cm$ and $AC = (x + 6)cm$

(ii) $AB = xcm$, $BC = (4x + 4)cm$ and $AC = (4x + 5)cm$

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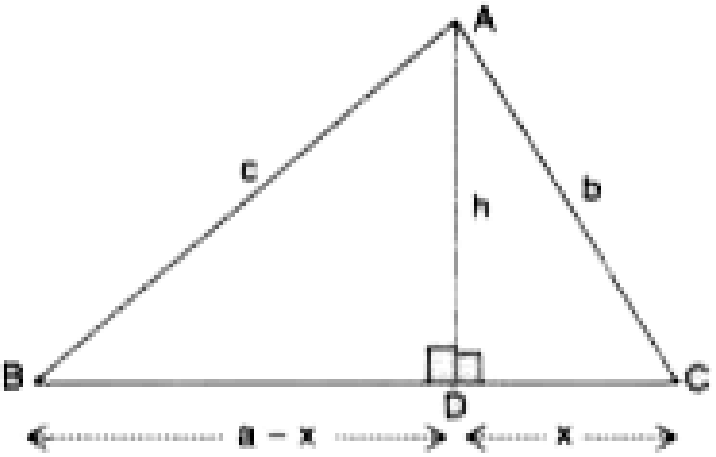
Exercise 13 B

1. In the figure, given below, AD $\perp$ BC.

Prove that : $c^2 = a^2 + b^2 - 2ax$.



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2. In equilateral $\triangle ABC$, $AD \perp BC$ and BC=x cm. Find, in terms of x, the length of AD.

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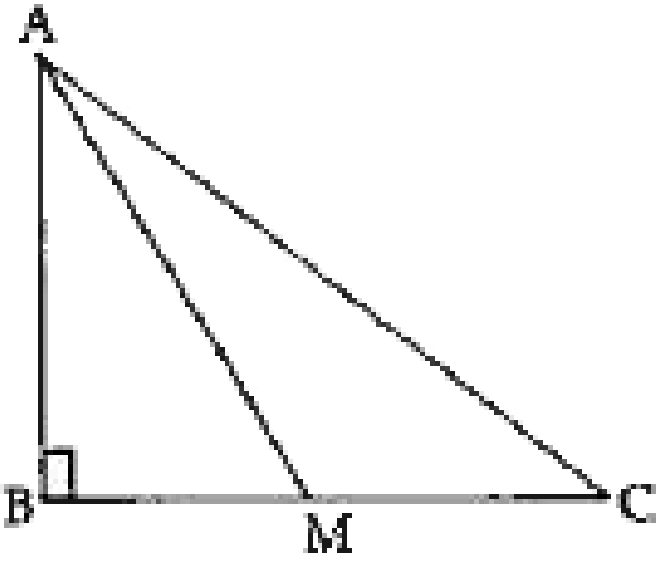
3. ABC is a triangle, right angled at B, M is a point on BC. Prove that :

$AM^2 + BC^2 = AC^2 + BM^2$



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

$PM^2 + RN^2 = 5MN^2$.

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

$4PM^2 = 4PQ^2 + QR^2$.

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

$4PM^2 = 4PQ^2 + QR^2$.

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7. In Figure, $PandQ$ are the midpoints of the sides $CAandCB$ respectively of ABC right angled at C. Prove that $4\left(AQ^2+BP^2\right)=5AB^2$.

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9. In a rectangle ABCD, prove that : $AC^2+BD^2=AB^2+BC^2+CD^2+DA^2.$

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10. In a quadrilateral ABCD, $\angle B=90^\circ$ and $\angle D=90^\circ$. Prove that :

$$2AC^2-AB^2=BC^2+CD^2+DA^2$$

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

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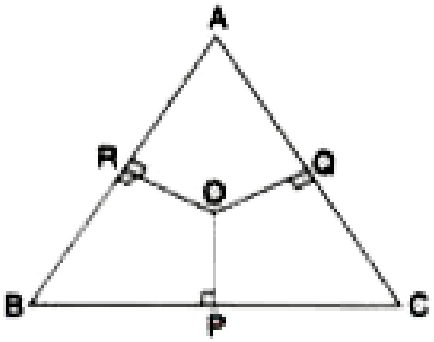
12. In the following figure, OP, OQ and OR are drawn perpendiculars to the sides BC, CA and AB repectively of triangle ABC. Prove that :

$AR^2 + BP^2 + CQ^2 = AQ^2 + CP^2 + BR^2$



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13. Diagonals of rhombus ABCD intersect each other at point O. Prove that :

$$OA^2 + OC^2 = 2AD^2 - \frac{BD^2}{2}$$

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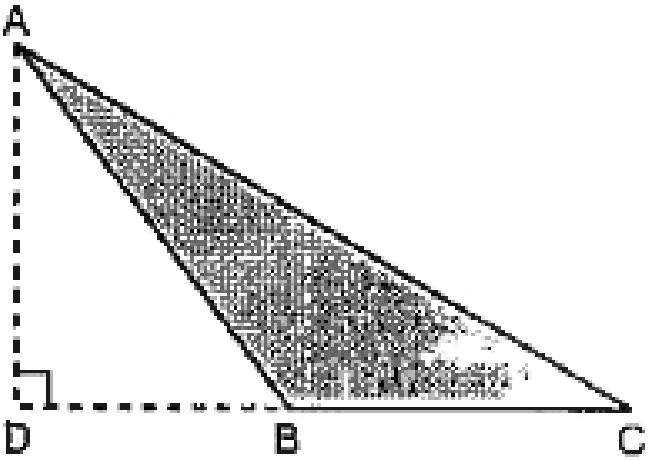
14. In the figure AB = BC and AD is perpendicular to CD. Prove that :

$$AC^2 = 2.BC.DC$$



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15. In an isosceles triangle ABC, AB = AC and D is a point on BC produced.

Prove that :

$AD^2 = AC^2 + BD.CD$

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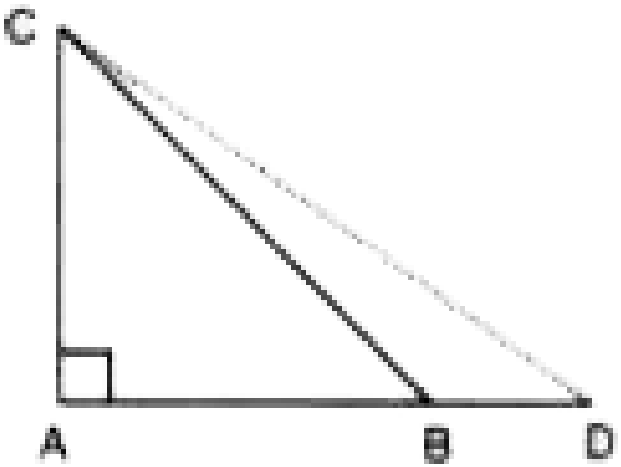
16. In triangle ABC, angle $A = 90^\circ$, $CA = AB$ and D is a point on AB produced. Prove that:

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



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17. In triangle ABC, AB=AC and BD is perpendicular to AC. Prove that : $BD^2 - CD^2 = 2CD \times AD$

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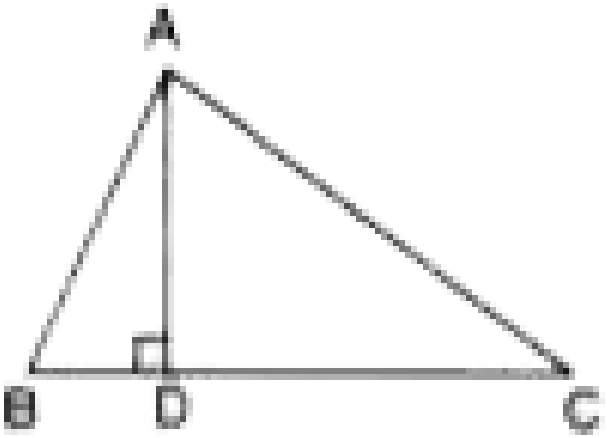
18. In the following figure, AD is perpendicular to BC and D divides BC in the ratio 1 : 3.



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Questions

1. 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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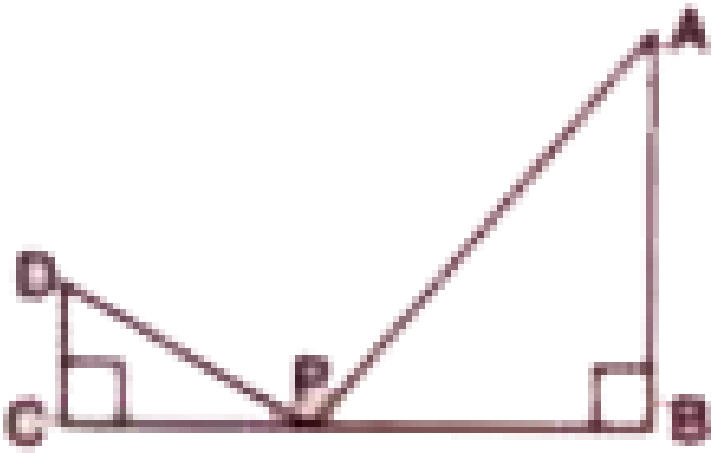
2. In the given diagram, $AB = 3CD = 18cm$ and $3BP = 4CP = 36cm$. Show that the measure of angle is 90°.



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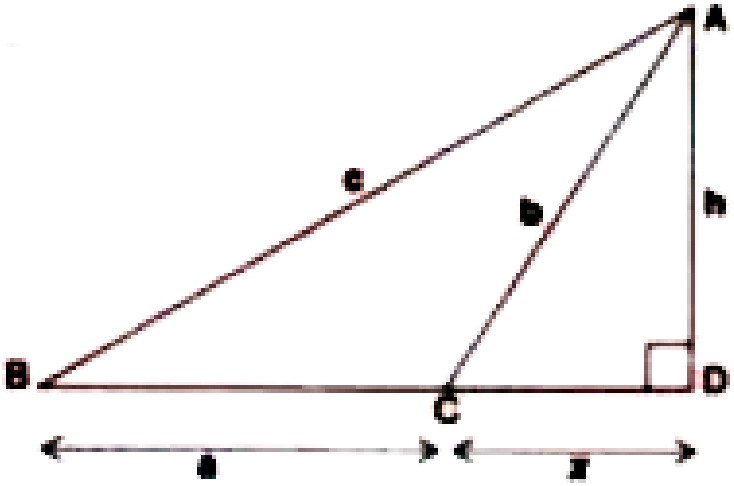
3. In the given figure, AD is perpendicular to BC produced. Prove that: $c^2 = a^2 + b^2 + 2ax$.



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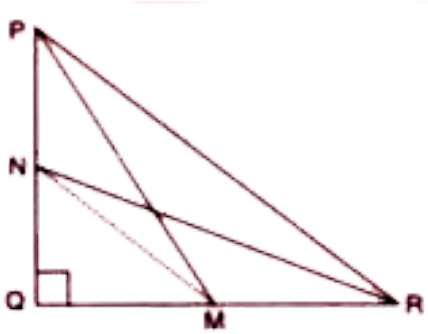
4. M and N are point on sides QR and PQ respectively of $\triangle PQR$, right-angled at Q. Prove that :

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



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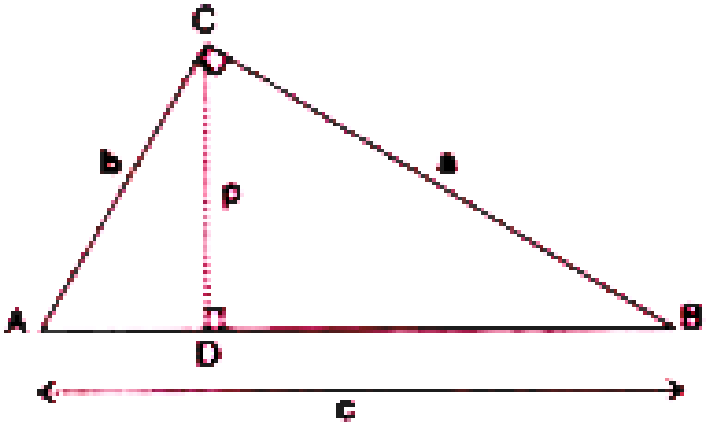
5. In triangle ABC, $\angle ABC = 90^\circ$, AB= c unit, BC= a unit, AC=b unit, CD is perpendicular to AB and CD= p unit.

Prove that : $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$



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6. ABC is an equilateral triangle, P is a point in BC such that BP : PC =2 : 1.

Prove that : $9AP^2 = 7AB^2$

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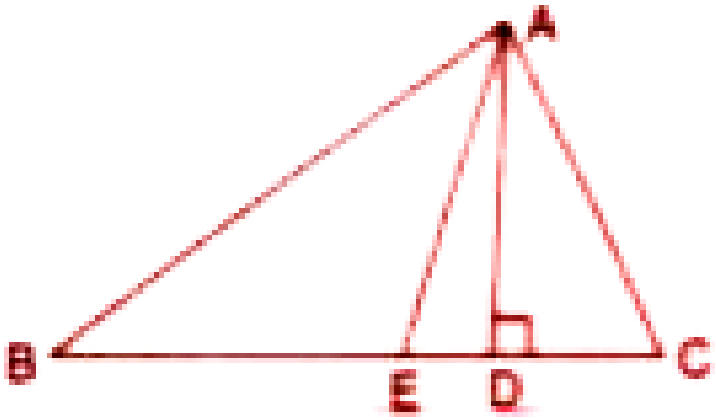
7. The given figure shows a triangle ABC, in which AB $>$ AC. E is the mid-point of BC and AD is perpendicular to BC.

Prove that : $AB^2 + AC^2 = 2BE^2 + 2AE^2$



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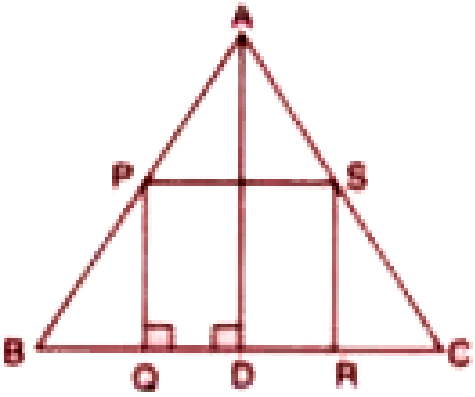
8. ABC is an isosceles triangle in which AB=AC =20 cm and BC=24 cm. PQRS is a rectangle drawn inside the isosceles triangle. Given PQ=SR=y cm and PS=QR=2x cm.

Prove that : $y = 16 - \frac{4x}{3}$.



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9. Prove 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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