



MATHS

BOOKS - TARGET PUBLICATION

PYTHAGORAS THEOREM

Example

1. Verify that $(3,4,5), (5,12,13), (8,15,17), (24,25,7)$ are the Pythagorean triplets



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2. Assign different values to a and b and obtain Pythagorean triplets.



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Practice Set 2 1

1. Identify, with reason, which of the following are Pythagorean triplets :

(3,5,4)



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2. Identify, with reason, which of the following are Pythagorean triplets :

(4, 9, 12)

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3. Identify, with reason, which is Pythagorean triplets.

(5,12,13)

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4. Identify, with reason, which of the following are Pythagorean triplets :

(24,70,74)



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5. Identify , with reason , which of the following are Pythagorean triplets :

(10,24,27)

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6. Identify , with reason , which of the following are Pythagorean triplets :

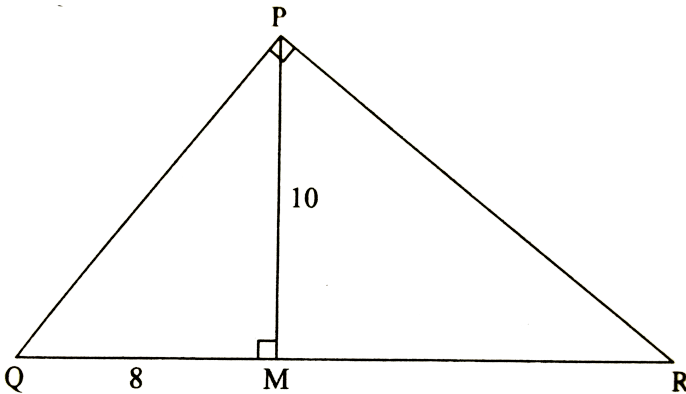
(11,60,61)

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7. In the adjoining figure, $\angle MNP = 90^\circ$, $segNQ \perp segMP$, $MQ=9$, $QP=4$ find NQ .

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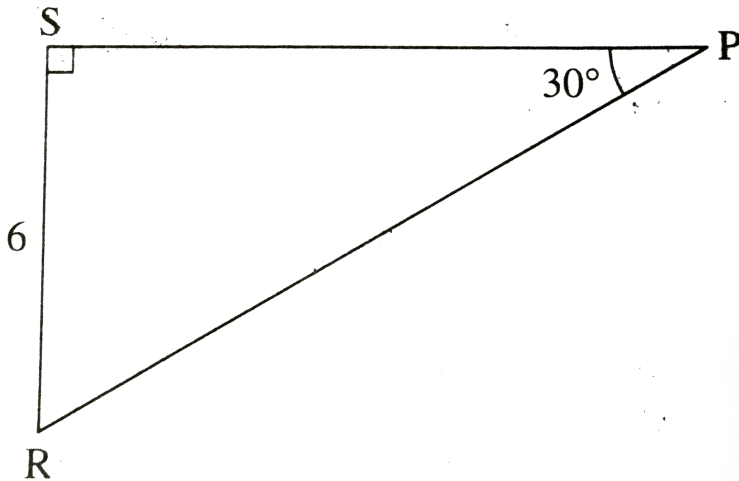
8. In the figure, $\angle QPR = 90^\circ$, $segPM \perp segQR$ and $Q - M - R$, $PM = 10$. $QM = 8$, find QR .



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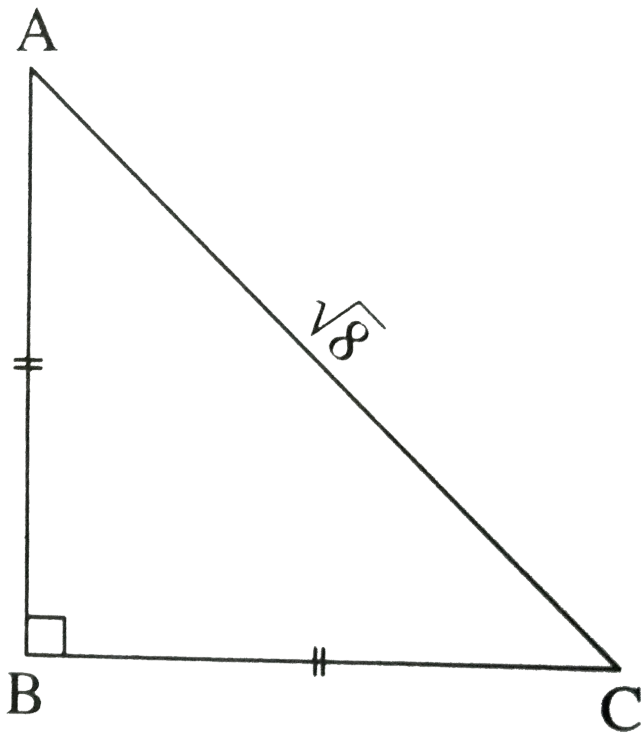
9. See figure Find RP and PS using the information given in

\triangle PSR



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10. For finding AB and BC with the help of information given in figure , complete following activity :



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11. Find the side and perimeter of a square whose diagonal is 10 cm.

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12. In the adjoining figure,

$\angle DFE = 90^\circ$, $FG \perp ED$. If $GD = 8$, $FG = 12$, find

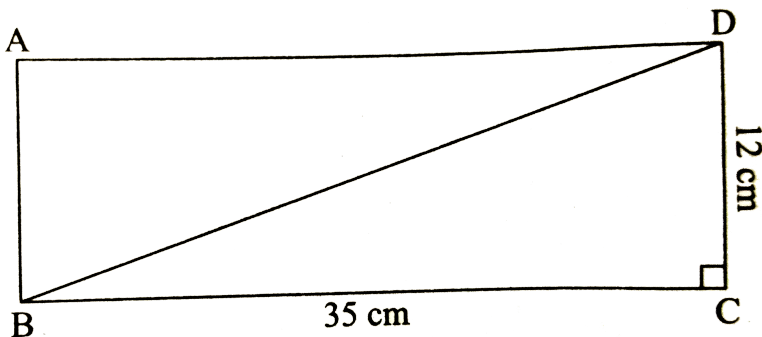
(i) EG

(ii) FD, and

(iii) EF

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13. Find the diagonal of a rectangle whose length is 35cm and breadth is 12cm .





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14. In the figure, M is the midpoint of QR . $\angle PRQ = 90^\circ$.

Prove that $PQ^2 = 4PM^2 - 3PR^2$



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15. Walls of two buildings on either side of a street are parallel to each other. A ladder $5.8m$ long is placed on the street such that its top just reaches the window of a building at the height of $4m$. On turning the ladder over to the other side of the street, its top touches the window of the other building at a height $4.2m$. Find the width of the street.





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Try This

1. In $\triangle ABC$, if M is the midpoint of BC and seg $AM \perp$ seg BC, then prove that $AB^2 + AC^2 = 2AM^2 + 2BM^2$.



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Practice Set 2.2

1. In $\triangle PQR$, point S is the midpoint of side QR. If $PQ=11$, $PR=17$, $PS=13$, then find QR.



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Practice Set 2 3

1. In $\triangle ABC$, $AB=10$, $AC=7$, $BC=9$. Find the length of the median drawn from point C to side AB.

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Practice Set 2 4

1. In the adjoining figure, seg PS is the median of $\triangle PQR$ and $PT \perp QR$.

i. $PR^2 = PS^2 + QR \times ST + \left(\frac{QR}{2}\right)^2$

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Practice Set 2 5

1. In $\triangle ABC$, point M is midpoint of side BC . If $AB^2 + AC^2 = 290\text{cm}^2$ and $AM=8$ cm, find BC .

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Practice Set 2 6

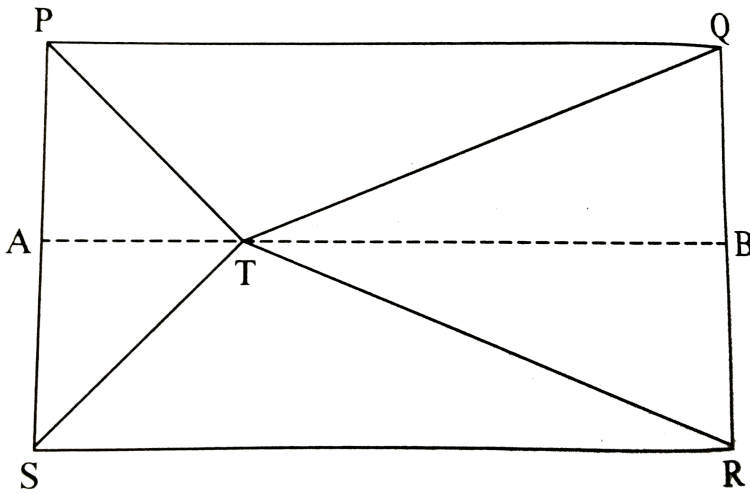
1. In the figure , point T is in the interior of rectangle $PQRS$.

Prove that,

$$TS^2 + TQ^2 = TP^2 + TR^2$$

(As shown in the figure, draw $\text{seg } AB \parallel \text{side } SR$ and

$A - T - B$.)



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Problem Set 2

1. Out of the following which is a Pythagorean triplet? a)

(1,5,10) b) (3,4,5) c) (2,2,2) d) (5,5,2)

A. (1,5,10)

B. (3,4,5)

C. (2,2,2)

D. (5,5,2)

Answer: B



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2. In a right angled triangle, if sum of the squares of the sides making right angle is 169 then what is the length of the hypotenuse? a)12 b)13 c)15 d)5

A. 15

B. 13

C. 5

D. 12

Answer: B



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3. out of the dates given below which date constitutes a Pythagorean triplet?

A. 15/08/17

B. 16/08/16

C. 3/5/17

D. 4/9/15

Answer: A



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4. If a, b, c are sides of a triangle and $a^2 + b^2 = c^2$, then name the type of triangle. a) Obtuse angled triangle b) Acute angled triangle c) Right angled triangle d) Equilateral triangle

- A. Obtuse angled triangle
- B. Acute angled triangle
- C. Right angled triangle
- D. Equilateral triangle

Answer: C



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5. Find perimeter of a square if its diagonal is $10\sqrt{2}$ cm. a)

10 cm b) $40\sqrt{2}$ cm c) 20 cm d) 40 cm

A. 10 cm

B. $40\sqrt{2}$ cm

C. 20 cm

D. 40 cm

Answer: D



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6. Altitude on the hypotenuse of a right angled triangle divides it in two parts of lengths 4 cm and 9 cm. Find the length of the altitude.

A. 9 cm

B. 4 cm

C. 6 cm

D. $2\sqrt{6}$ cm

Answer: C = 6cm



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7. Height and base of a right angled triangle are 24 cm and 18 cm, find the length of its hypotenuse. a) 24cm b) 30cm c) 15cm d) 18cm

A. 24 cm

B. 30 cm

C. 15 cm

D. 18 cm

Answer: B



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8. In $\triangle ABC$, $AB = 6\sqrt{3}cm$, $AC = 12cm$, $BC = 6cm$. Find the measure of $\angle A$.

A. 30°

B. 60°

C. 90°

D. 45°

Answer: A



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Problem Set 10

1. Find the height of an equilateral triangle having side $2a$.

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2. Do sides 7 cm, 24 cm, 25 cm form a right angled triangle?

Give reason.

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3. Find the length of diagonal of a rectangle having dimensions 11 cm and 60 cm.

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4. Find the length of the hypotenuse of a right angled triangle if remaining sides are 9 cm and 12 cm

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5. Side of isosceles right angled triangle is x . Find its hypotenuse.

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6. In $\triangle PQR$, $PQ = \sqrt{8}$, $QR = \sqrt{5}$, $PR = \sqrt{3}$. Is $\triangle PQR$ a right angled triangle? If yes, which angle is 90° ?

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7. In $\triangle RST$, $\angle S = 90^\circ$, $\angle T = 30^\circ$, $RT=12$ cm. Find RS and ST.

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8. Find the diagonal of a rectangle whose length is 16 cm and area is 192 sq.cm.

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9. Find the length of the side and perimeter of an equilateral triangle whose height is $\sqrt{3}$ cm.

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10. In $\triangle ABC$, seg AP is a median. If $BC = 18$, $AB^2 + AC^2 = 260$, then find AP.

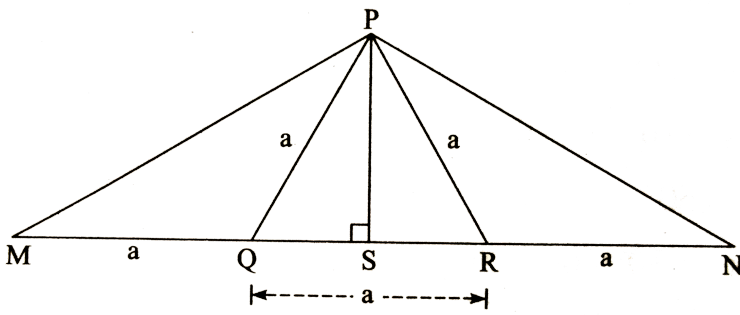
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11. $\triangle ABC$ is an equilateral triangle. Point P is on base BC such that $PC = \frac{1}{3}BC$, if $AB = 6$ cm, find AP.

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12. From the information given in the figure, prove that

$$PM = PN = \sqrt{3} \times a.$$



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13. 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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14. Paranali and Prasad started walking to the East and to the North respectively, from the same point and at the

same speed. After 2 hours distance between them was $15\sqrt{2}$ km. Find their speed per hour.

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15. In $\triangle ABC$, $\angle BAC = 90^\circ$, seg BL and seg CM are medians of $\triangle ABC$. Then prove that

$$4(BL^2 + CM^2) = 5BC^2$$

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16. Sum of the squares of adjacent sides of a parallelogram is 130 cm length of one of its diagonals is 14 cm. Find the length of the other diagonal.

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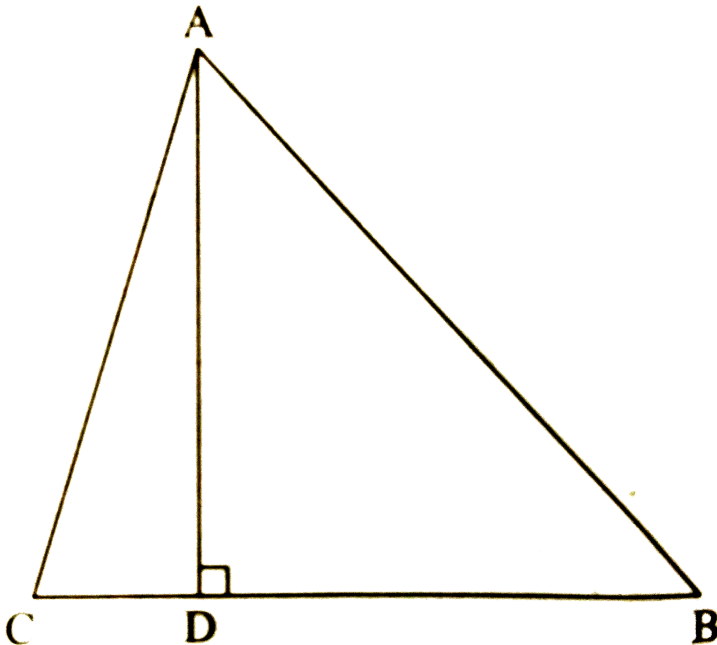
Problem Set 26

1. In $\triangle ABC$,

seg $AD \perp$ seg BC ,

$DB = 3CD$.

Prove that $2AB^2 = 2AC^2 + BC^2$.



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Problem Set 27

1. In an isosceles triangle, length of each congruent side is 13 cm and length of the base is 10 cm. Find the distance between vertex opposite to base and centroid.

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Problem Set 30

1. Seg PM is a median of $\triangle PQR$. If $PQ=40$, $PR=42$ and $PM=29$, find QR .



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Problem Set 31

1. Seg AM is a median of $\triangle ABC$. If $AB=22$, $AC=34$, $BC=24$, find AM.

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Activities For Practice

1. In $\triangle ABC$, point M is midpoint of side BC. If $AB^2 + AC^2 = 290\text{cm}^2$ and $AM=8$ cm, find BC.

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2. Find the length of the side and perimeter of an equilateral triangle whose height is $\sqrt{3}$ cm.



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Multiple Choice Questions

1. Which of the following triplets will not form a right angled triangle?

A. 50,30,40

B. 15,20,25

C. 20,29,21

D. 12,16,11

Answer:



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2. If in $\triangle ABC$ $AB = 15$ cm, $BC = 17$ cm and $AC = 8$ cm then which of the following will be a right angle?

A. $\angle A$

B. $\angle B$

C. $\angle C$

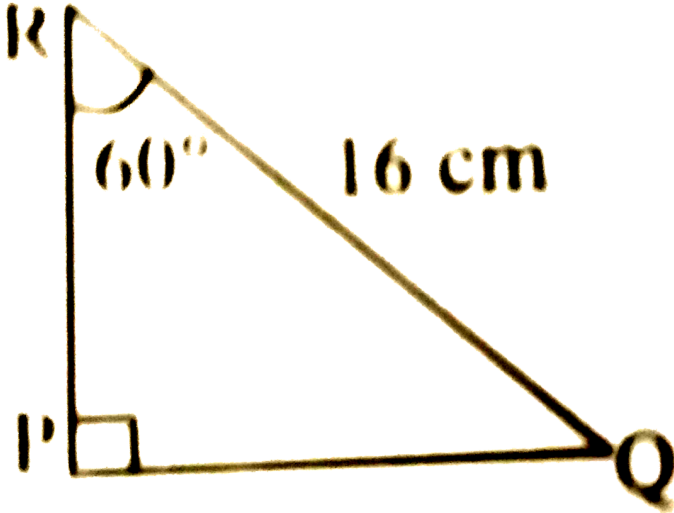
D. non of these

Answer:



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3. From the figure given below, the length of PQ and PR are and respectively.



A. $8\text{cm}, 8\sqrt{2}\text{cm}$

B. $8\sqrt{2}\text{cm}, 8\text{cm}$

C. $8\text{cm}, 8\sqrt{3}\text{cm}$

D. $8\sqrt{3}\text{cm}, 8\text{cm}$

Answer:



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4. The length of the longest segment which can be drawn in a rectangle of length 84cm and breadth 13 cm is

A. 84 cm

B. 85 cm

C. 86 cm

D. 97 cm

Answer:



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5. If the diagonal of a square is $25\sqrt{2}cm$, then the length of its side is

A. 50 cm

B. 25 cm

C. 5 cm

D. $5\sqrt{2}cm$

Answer:



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6. If the length of the hypotenuse of isosceles right angled triangle is 10 cm, then the length of the equal sides will be

..... .

- A. 10 cm
- B. $10\sqrt{2}cm$
- C. 5 cm
- D. $5\sqrt{2}cm$

Answer: D



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7. Diagonals of rhombus are 12 cm and 16 cm. Find its side.

- A. 10 cm
- B. 20 cm

C. $10\sqrt{2}cm$

D. $20\sqrt{2}cm$

Answer:

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8. Find diagonal of square with side 8 cm.

A. 8 cm

B. $4\sqrt{2}cm$

C. $8\sqrt{2}cm$

D. $8\sqrt{3}cm$

Answer:



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9. In an isosceles $\triangle ABC$, if

$AC = BC$ and $AB^2 = 2AC^2$ then $\angle C = ?$

A. 30°

B. 45°

C. 60°

D. 90°

Answer:



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10. ABC is an isosceles triangle in which $\angle ACB = 90^\circ$. If $AC = 2$ cm, then the value of AB is

A. $\sqrt{2}cm$

B. $2\sqrt{2}cm$

C. $3\sqrt{2}cm$

D. $4\sqrt{2}cm$

Answer:



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11. In an equilateral triangle ABC, if $AD \perp BC$, B-D-C and $AB = 12$ cm, then the value of AD is

A. 6 cm

B. $6\sqrt{3}cm$

C. 4 cm

D. $4\sqrt{3}cm$

Answer:



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12. A man goes 9 m due east and then 40 m due north. How far is he from the starting point?

A. 35 m

B. 39 m

C. 41 m

D. 45 m

Answer: C



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13. A ladder 25 m long reaches a window of a building 20 m above the ground. Determine the distance of the foot of the ladder from the building.

A. 10 m

B. 12 m

C. 15 m

D. 18 m

Answer: C



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14. In $\triangle PQR$, $\angle PQR = 90^\circ$ and $segQS \perp$ hypotenuse PR , $P-S-R$, then

A. $PR^2 = PQ \times PR$

B. $QS^2 = PS \times SR$

C. $PR^2 = PS \times SR$

D. $QS^2 = PQ \times QR$

Answer:



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15. In $\triangle ABC$, $\angle B = 90^\circ$, $BD \perp AC$, $A - D - C$. If $CD = 2$ cm and $AD = 8$ cm then BD is equal to

A. 2 cm

B. 4 cm

C. 6 cm

D. 8 cm

Answer:



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16. In $\triangle ABC$, CD is the median. If $AC^2 + BC^2 = 290$ and $CD = 9$ then $AD =$

A. 6

B. 7

C. 8

D. 9

Answer:



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Additional Problems For Practice Based On The Practice Set 2 1

1. Identify the Pythagorean triplets from the following:

i. (15,10,35)



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2. Identify the Pythagorean triplets from the following:

ii. (28,45,53)



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3. Identify the Pythagorean triplets from the following:

iii. (10,10,20)



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4. Identify the Pythagorean triplets from the following:

iv. (16,63,65)



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5. Identify the Pythagorean triplets from the following:

v. (20,21,29)



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6. Identify the Pythagorean triplets from the following:

vi. (9,20,21)



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7. In $\triangle ABC$, $\angle B = 90^\circ$, $\angle A = 30^\circ$, $AC = 14$, then find AB and BC .



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8.

In

ΔPQR , $\angle P = 30^\circ$, $\angle Q = 60^\circ$, $\angle R = 90^\circ$ and $PQ = 12\text{cm}$

, then find PR and QR.



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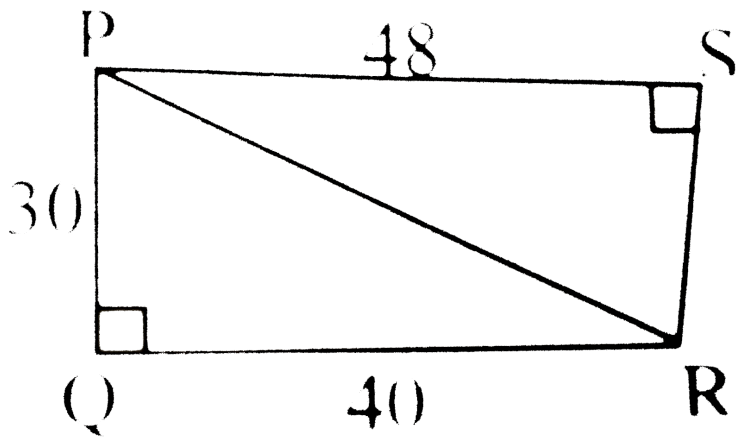
9. Find the length of the hypotenuse of a right angled triangle if remaining sides are 9 cm and 12 cm.



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10. In the adjoining figure, if

$\angle PQR = 90^\circ$, $\angle PSR = 90^\circ$, then find PR and RS.



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11. Find the side of a square whose diagonal is 10 cm.

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12. Find the side of a square whose diagonal is $16\sqrt{2}$ cm.

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13. In $\triangle LMN$, $l = 5$, $m = 13$, $n = 12$. State whether $\triangle LMN$ is a right angled triangle or not.

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14. A ladder 10 m long reaches a window 8m above the ground. Find the distance of the foot of the ladder from the base of the wall.

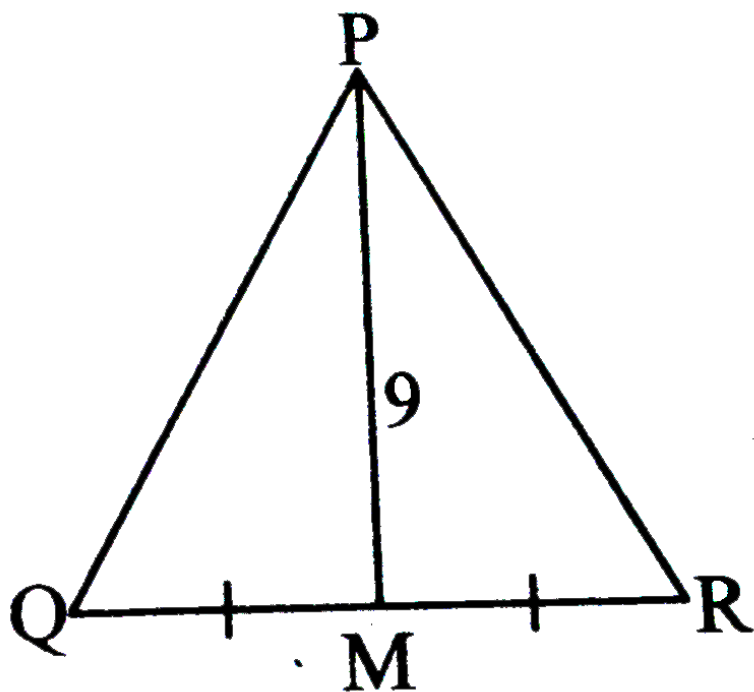
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15. In an isosceles triangle PQR , $PQ = PR$ and S is any point on side QR . Then prove that: $PQ^2 - PS^2 = QS \times SR$.

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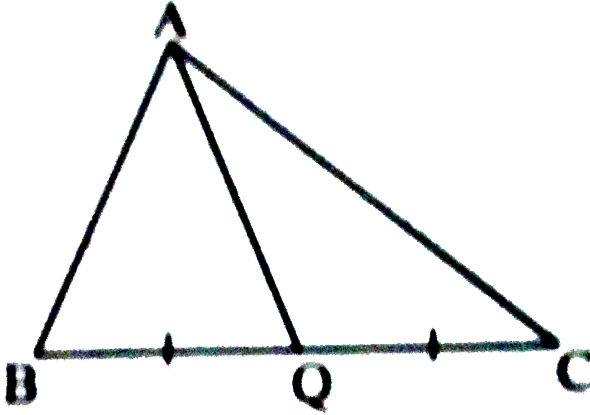
Additional Problems For Practice Based On The Practice Set 2 2

1. In the given figure, seg PM is a median of $\triangle PQR$. $PM = 9$ and $PQ^2 + PR^2 = 290$, then find QR.



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2. In the figure below, if $AB^2 + AC^2 = 122$, $BC = 10\text{cm}$, then find the length of median drawn to side BC .



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3. In $\triangle ABC$, $\angle ABC = 90^\circ$, $AB = 12$, $BC = 16$ and seg BP is the median drawn to side AC . Find the length of seg BP .

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4. Adjacent sides of a parallelogram are 11 cm and 17 cm. If the length of one of its diagonals is 26 cm, find the length of the other.

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Chapter Assessment

1. Which of the following triplets will not form a right angled triangle?

A. (5,12,13)

B. (8,15,17)

C. (20,10,11)

D. (0,40,41)

Answer:



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2. In ΔPQR , $\angle Q = 30^\circ$, $\angle R = 90^\circ$ and the length of the hypotenuse is 20 cm. What will be length of QR?

A. 10cm

B. $10\sqrt{3}cm$

C. $10\sqrt{2}cm$

D. $5\sqrt{2}cm$

Answer:



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3. If the length of the diagonal of a square is 16 cm, then its perimeter will be

A. 32cm

B. $32\sqrt{2}cm$

C. 64cm

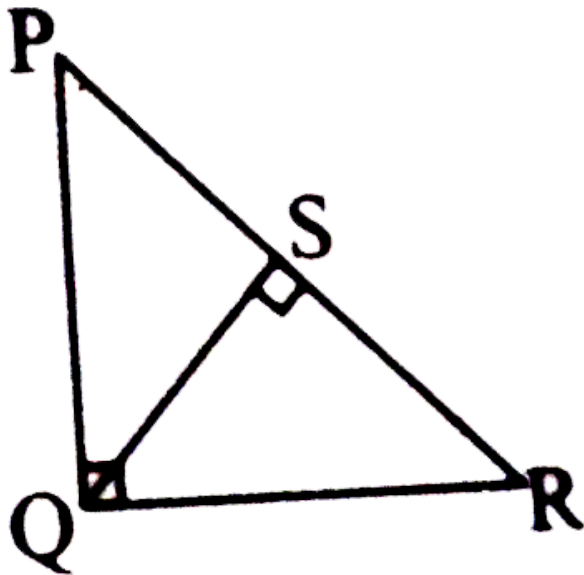
D. $64\sqrt{2}cm$

Answer:



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4. In $\triangle PQR$, $\angle Q = 90^\circ$ and $QS \perp PR$. If $PS=32\text{cm}$, $SR=8\text{cm}$, then $QS=$



- A. 8cm
- B. $2\sqrt{10}\text{cm}$
- C. 16cm
- D. 40cm

Answer:

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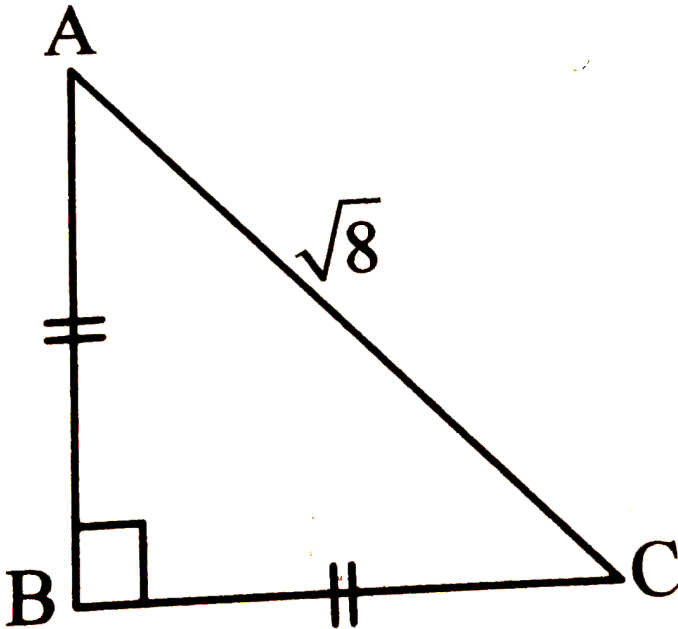
5. Find the diagonal of rectangle having length and breadth 12cm and 8cm respectively.

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6. In $\triangle ABC$, AP is a median on side BC. If $AP=7$, $AB^2 + AC^2 = 260$, find BC.

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7. For finding AB and BC with the help of information given in the adjoining figure,



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8. A 50 m long ladder reaches a window 14 m above the ground. Find the distance of the foot of the ladder from

the base of the wall.

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9. Find the side of a square whose diagonal is 10 cm.

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10. The height of an equilateral triangle having each side 12 cm, is

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11. Prove that, in a right-angled triangle, the square of hypotenuse is equal to the sum of the square of remaining

two sides.



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12. $\triangle ABC$ is an equilateral triangle. Point P is on base BC such that $PC = \frac{1}{3}BC$, if $AB = 6$ cm, find AP.



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13. The length of one side of a parallelogram is 17 cm. If the length of its diagonals are 12 cm and 26 cm, then find the length of the other sides of the parallelogram.



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