

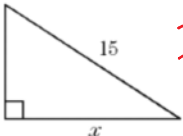
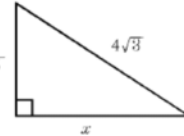
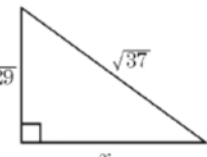
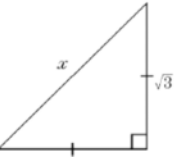
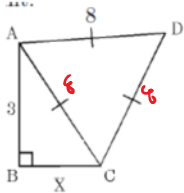
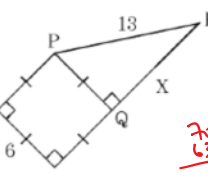
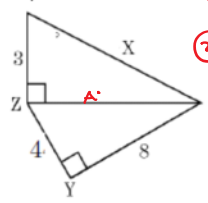
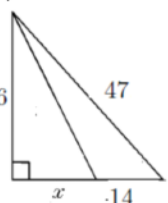
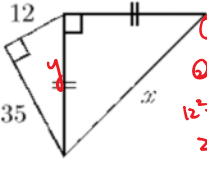
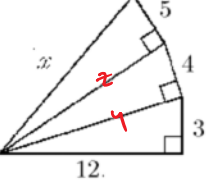
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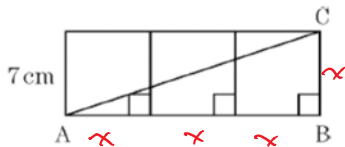
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Section 4.2 Applications and Problems with the Pythagorean Theorem: $a^2 + b^2 = c^2$

1. Solve for "x" in each of the following diagrams:

<p>i)</p>  <p>$x^2 = 15^2 - 7^2$ $x^2 = (15-7)(15+7)$ $x^2 = (8)(22)$ $x = 2\sqrt{2 \times 22}$ $x = 4\sqrt{11} //$</p>	<p>ii)</p>  <p>$x^2 = (4\sqrt{3})^2 - (\sqrt{5})^2$ $x^2 = 48 - 5$ $x^2 = 43$ $x = \sqrt{43} //$</p>
<p>iii)</p>  <p>$x^2 = (\sqrt{37})^2 - (\sqrt{29})^2$ $= 37 - 29$ $x^2 = 8$ $x = 2\sqrt{2} //$</p>	<p>iv)</p>  <p>$x^2 = (\sqrt{3})^2 + (\sqrt{3})^2$ $x^2 = 3 + 3$ $x^2 = 6$ $x = \sqrt{6} //$</p>
<p>v)</p>  <p>① $AC = 4$ ② $x^2 = 8^2 - 3^2$ $x^2 = (8+3)(8-3)$ $x^2 = 11 \times 5$ $x = \sqrt{55} //$</p>	<p>vi)</p>  <p>① $PQ = 6$ ② $x^2 = 13^2 - 6^2$ $x^2 = (13+6)(13-6)$ $x^2 = (19)(7)$ $x = \sqrt{133} //$</p>
<p>vii)</p>  <p>① $3^2 + 4^2 = A^2$ ② $3^2 + A^2 = x^2$ $3^2 + (3^2 + 4^2) = x^2$ $9 + 64 + 16 = x^2$ $89 = x^2$ $\sqrt{89} = x$</p>	<p>viii)</p>  <p>$26^2 + (x+14)^2 = 47^2$ $(x+14)^2 = 47^2 - 26^2$ $(x+14)^2 = (47+26)(47-26)$ $(x+14)^2 = (73)(21)$ $x+14 = \pm\sqrt{1533}$ $x = -14 + \sqrt{1533} //$</p>
<p>ix)</p>  <p>① $12^2 + 35^2 = y^2$ $144 + 1225 = y^2$ $1369 = y^2$ $37 = y$ ② $y^2 + y^2 = x^2$ $12^2 + 35^2 + 12^2 + 35^2 = x^2$ $2(144 + 1225) = x^2$ $\sqrt{2738} = x$</p>	<p>x)</p>  <p>① $y^2 = 3^2 + 12^2$ $y^2 = 9 + 144$ $y^2 = 153$ $y = \sqrt{153} //$</p>

2. Given the diagram below, if the length of each square is 7cm long, what is the length of AC?



$AC^2 = x^2 + (3x)^2$

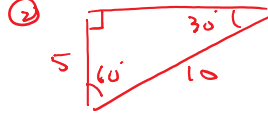
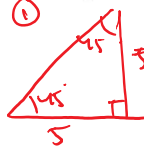
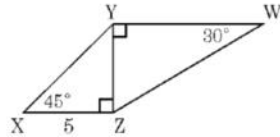
$= x^2 + 9x^2$

$AC^2 = 10x^2$

$AC = x\sqrt{10}$

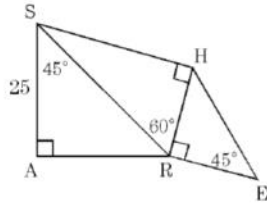
$AC = 7\sqrt{10} //$

3. Given the diagram below, find the length of sides YW and ZW:

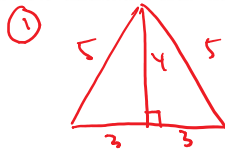


$YW = 5\sqrt{3} //$
 $ZW = 10 //$

4. Given the diagram below, find the length of HE.

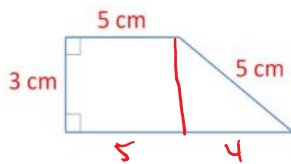


5. What is the number of square units in the area of a triangle whose sides measure 5, 5, and 6 units?



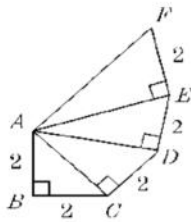
$A = \frac{6 \times 4}{2}$
 $= 12 \text{ unit}^2 //$

6. What is the area of the trapezoid?

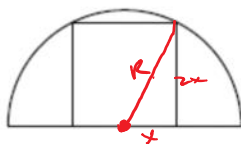


$A = \frac{(9+5) \times 3}{2}$
 $= 7 \times 3$
 $= 21 \text{ cm}^2 //$

7. Find the length of AF. Write your answer as a mixed radical.



8. What is the area of the square inscribed in a semicircle of radius $3\sqrt{2}$? Express your answer as a fraction.

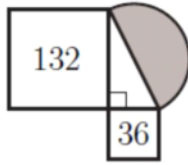


$R = 3\sqrt{2}$
 $R^2 = x^2 + (2x)^2$
 $18 = x^2 + 4x^2$
 $18 = 5x^2$
 $x^2 = \frac{18}{5}$
 $\text{Area} = 4x^2 = 4\left(\frac{18}{5}\right) = \frac{72}{5} //$

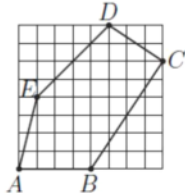
9. Two vehicles leave the same town at 8am. One travels north at 30mph, the other travels west at 45mph. To the nearest hundredth of a mile, how far apart are they at 11am the same day?

10. A ship leaves port at 8am travelling due south at 12km/hr. At 3pm the ship changes course and travels due east at 10km/hr. About how far is the ship from its starting point at 8am the next morning?

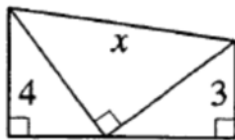
11. Squares are erected on the two legs of a right-angled triangle. These squares have areas 36 and 132 as shown. A semicircle (shaded) is drawn with the hypotenuse as diameter. What is the area of the semicircle? Give your answer in terms of π ?



12. Each small square in the diagram below has area 1 unit². The diagram consists of 64 squares. What is the area enclosed by the 5 sided figure ABCDE? The points A, B, C, D, and E are all grid points.

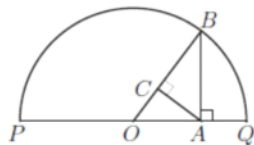


13. The trapezoid has been split into three right triangles, two of which are congruent. If the trapezoid's bases have lengths 3 and 4, how long is the trapezoid's longer leg "x"?

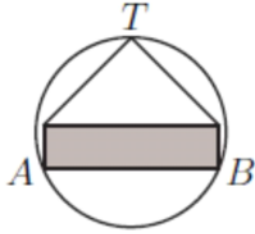


14. The edges of a rectangular prism are 8, 10, and 12cm. What is the distance from one corner of the rectangular prism to the opposite corner?

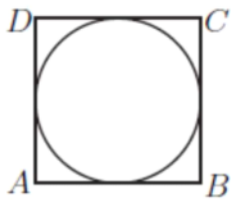
15. The figure below is a half-circle with center O. Given that PA=13 and QA =3, what is the length of OC? Express your answer as a common fraction.



16. The shaded rectangle below has base AB of length 4 and height 1. An isosceles triangle is erected with base the side opposite to AB. The triangle is right-angled at T. A circle is drawn passing through A, B, and T. What is the radius of the circle? Express your answer as a common fraction.



17. In the diagram below, a circle of radius greater than 9cm is inscribed in the square ABCD. A point P on the circle is 8cm from side AB of the square, and 9cm from side AD. What is the radius of the circle?



18. A triangle has vertices $A(0,0)$, $B(13,0)$, and $C(5,7)$. The triangle is inscribed in a circle. What are the coordinates of the center of the circle? Express your answer in the form of (x,y) where "x" and "y" are common fractions

19. The diagram below shows a 3 X 4 X 7 rectangular box. What is the length of the shortest path on the surface of the box from point "X" to point "Y". Give your answer as a mixed radical.

