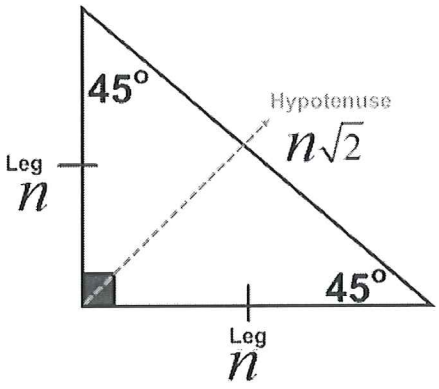
Section 10.2
Special Right Triangles

Key

Steps

1) Set each side Equal to the correct "n" expression
2) solve for n
3) plug "n" into the other equations to find the missing sides

45° – 45° – 90° Triangle Theorem

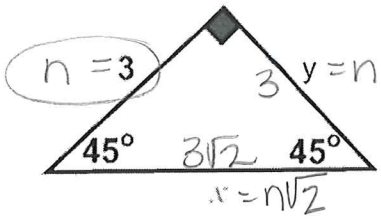


Hypotenuse = Leg · $\sqrt{2}$

Examples

Find the value of the missing variables. If necessary, leave your answer in simplest radical form.

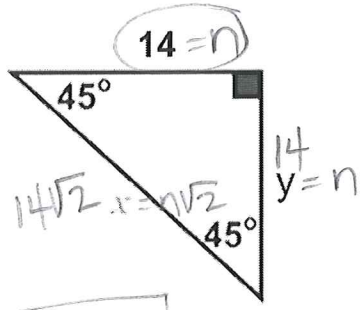
1.



$y = 3$

$x = 3\sqrt{2}$

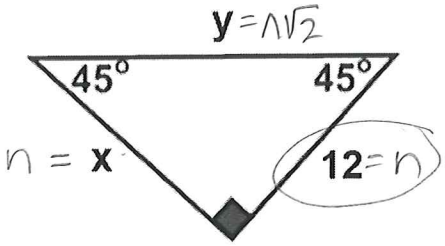
2.



$y = 14$

$x = 14\sqrt{2}$

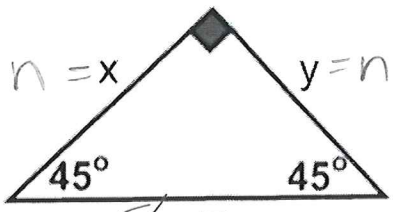
3.



$x = 12$

$y = 12\sqrt{2}$

4.



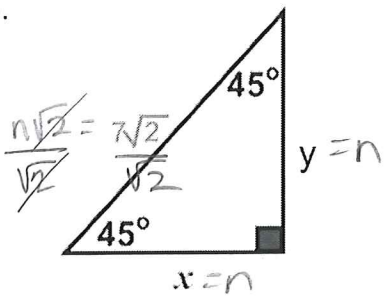
$\frac{n\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{\sqrt{2}}$

$n = 1$

$x = 1$

$y = 1$

5.



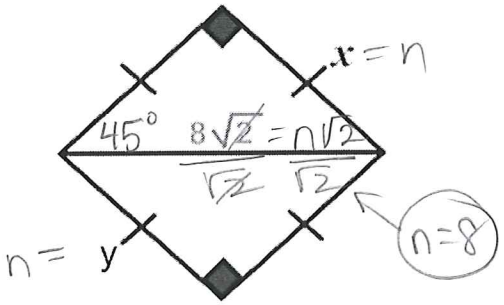
$\frac{n\sqrt{2}}{\sqrt{2}} = \frac{7\sqrt{2}}{\sqrt{2}}$

$n = 7$

$x = 7$

$y = 7$

6.



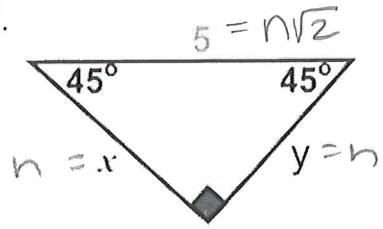
$x = 8$

$y = 8$

Find the value of the missing variables. If necessary, leave your answer in simplest radical form.

Note: In addition to removing any perfect squares, "simplest radical form" also means removing any radicals in the denominator of fractions.

7.



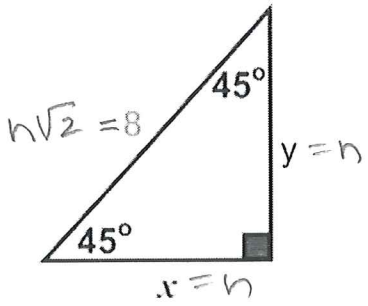
$\frac{5}{\sqrt{2}} = \frac{n\sqrt{2}}{\sqrt{2}}$

$n = \frac{5}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{5\sqrt{2}}{2}$

$x = \frac{5\sqrt{2}}{2}$

$y = \frac{5\sqrt{2}}{2}$

8.



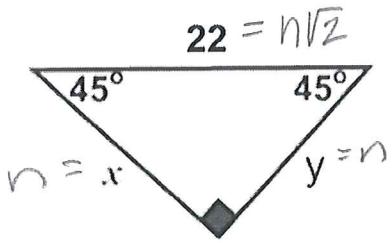
$\frac{n\sqrt{2}}{\sqrt{2}} = \frac{8}{\sqrt{2}}$

$n = \frac{8}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{8\sqrt{2}}{2}$

$x = 4\sqrt{2}$

$y = 4\sqrt{2}$

9.



$\frac{n\sqrt{2}}{\sqrt{2}} = \frac{22}{\sqrt{2}}$

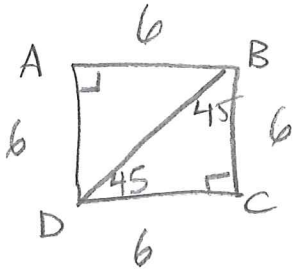
$n = \frac{22}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{22\sqrt{2}}{2}$

$x = 11\sqrt{2}$

$y = 11\sqrt{2}$

For # 10 – 11, use your Special Right Triangle Relationships to find the missing lengths. Leave your answers in simplest radical form.

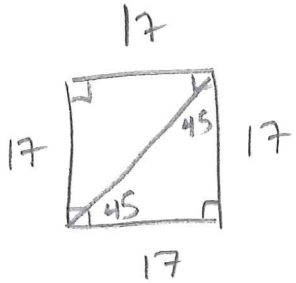
10. ABCD is a square with a perimeter of 24 inches. Find the length of segments BC and BD. Sketch and label a diagram.



BC = 6

BD = $6\sqrt{2}$

11. A square piece of paper 17 cm on a side is folded along a diagonal. What is the length of the diagonal? Sketch and label a diagram.



$17\sqrt{2}$

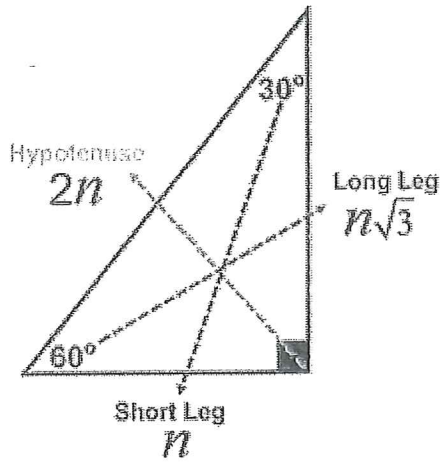
Key

Section 10.2
Special Right Triangles

30° – 60° – 90° Triangle Theorem

Hypotenuse = 2 · Short Leg

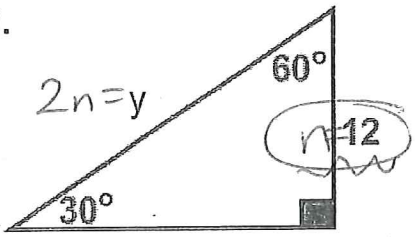
Long Leg = Short Leg · $\sqrt{3}$



Examples

Find the value of each variable. If necessary, leave your answer in simplest radical form.

1.



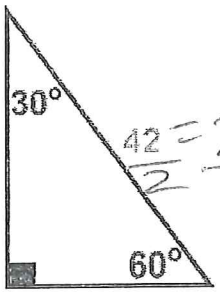
$x = n\sqrt{3}$

$x = 12\sqrt{3}$

$y = 2(12)$

$y = 24$

2.



$n\sqrt{3} = x$

$\frac{42}{2} = \frac{2n}{2}$

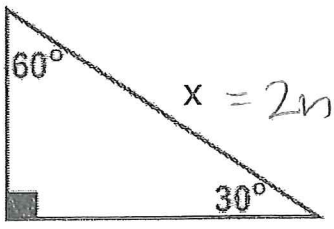
$n = 21$

$y = n$

$y = 21$

$x = 21\sqrt{3}$

3.



$n = 25\sqrt{3}$

$y = n\sqrt{3}$

$x = 2(25\sqrt{3})$

$x = 50\sqrt{3}$

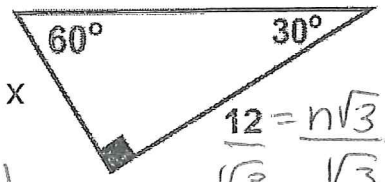
$y = 25\sqrt{3}\sqrt{3}$

$y = 25 \cdot 3$

$y = 75$

4.

$y = 2n$



$n = x$

$\frac{12}{\sqrt{3}} = \frac{n\sqrt{3}}{\sqrt{3}}$

$x = 4\sqrt{3}$

$n = \frac{12}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$

$y = 2(4\sqrt{3})$

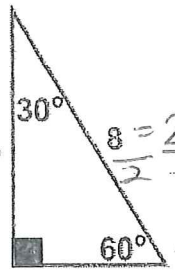
$n = \frac{12\sqrt{3}}{3}$

$y = 8\sqrt{3}$

$n = 4\sqrt{3}$

Solve for the variables using Special Right Triangle Relationships. Leave your answers in simplest radical form.

5.



$n\sqrt{3} = y$

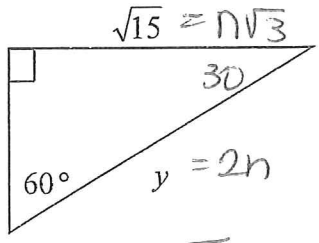
$8 = \frac{2n}{2}$ ·2

$n = 4$

$x = 4$

$y = 4\sqrt{3}$

6.



$n = x$

$x = \sqrt{5}$

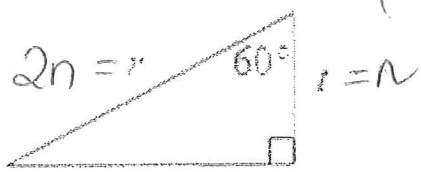
$y = 2\sqrt{5}$

$\frac{\sqrt{15}}{\sqrt{3}} = \frac{n\sqrt{3}}{\sqrt{3}}$

$\sqrt{\frac{15}{3}} = n$

$\sqrt{5} = n$

7.



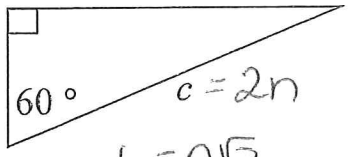
$\frac{5\sqrt{3}}{\sqrt{3}} = \frac{n\sqrt{3}}{\sqrt{3}}$

$5 = n$

$t = 5$

$r = 10$

8.



$\frac{6}{\sqrt{3}} = \frac{n\sqrt{3}}{\sqrt{3}}$

$g = 2\sqrt{3}$

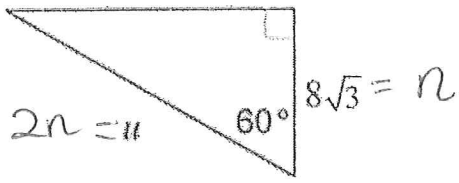
$n = \frac{6}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{6\sqrt{3}}{3}$

$c = 2 \cdot (2\sqrt{3})$

$n = 2\sqrt{3}$

$c = 4\sqrt{3}$

9.



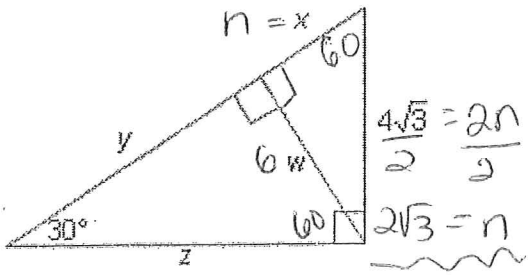
$u = 2(8\sqrt{3})$

$u = 16\sqrt{3}$

$V = 8\sqrt{3}\sqrt{3} \rightarrow V = 8 \cdot 3$

$V = 24$

10. Solve for the variables:



$\frac{4\sqrt{3}}{2} = \frac{2n}{2}$

$2\sqrt{3} = n$

$x = 2\sqrt{3}$

$z = 12$

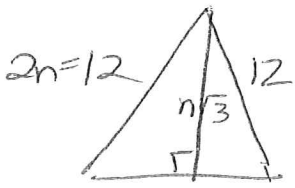
$w = (2\sqrt{3})(\sqrt{3})$

$y = 6\sqrt{3}$

$w = 2 \cdot 3$

$w = 6$

11. The perimeter of an equilateral triangle is 36 centimeters. Find the length of the altitude of the triangle.



$n = 6\sqrt{12}$

$6\sqrt{3}$ cm