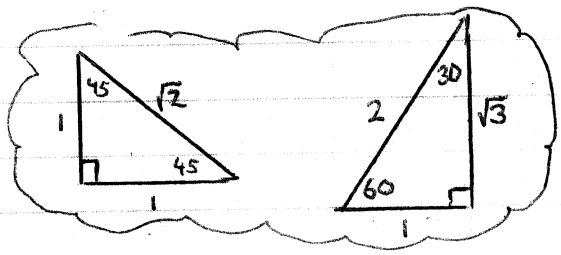
Geometry Ch 7-4 Exer., pg 455 #1-5, 8-10, 13-18, 31

1. A triangle with two congruent sides and a right angle is called <u>an isosceles right triangle.</u>

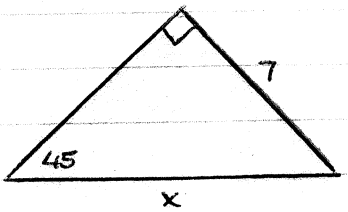
2. Explain why the acute angles in an isosceles right triangle always measure 45°.

   A Triangle's total angle measure is 180°. Take away 90° from the right angle will leave 90°. Because its an isosceles triangle, this remaining 90° must be divided evenly between the two angles: 45° and 45°

Find the value of x. Write answer in simplest radical form.

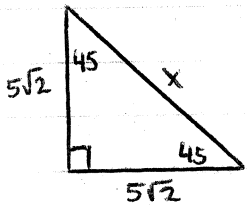


3.



$\frac{x}{7} = \frac{\sqrt{2}}{1}$ $\boxed{x = 7\sqrt{2}}$

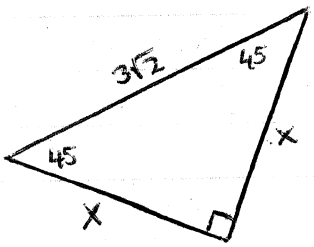
4.



$\frac{x}{5\sqrt{2}} = \frac{\sqrt{2}}{1}$ $x = (5\sqrt{2})(\sqrt{2})$

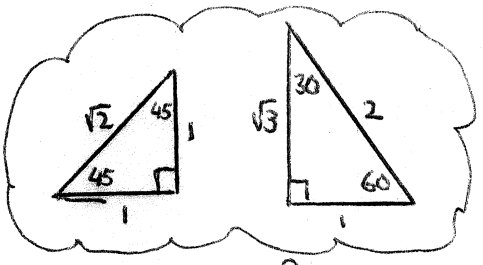
$\boxed{x = 10}$

5.



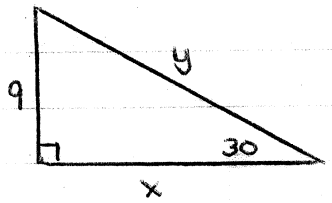
$\frac{x}{3\sqrt{2}} = \frac{1}{\sqrt{2}}$ $x = \frac{3\cancel{\sqrt{2}}}{\cancel{\sqrt{2}}}$

$\boxed{x = 3}$



Find the value of x. and y Write answer in simplest radical form.

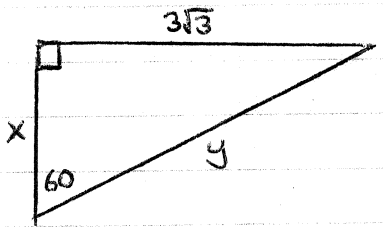
8.



$\frac{y}{9} = \frac{2}{1}$ $\boxed{y = 18}$

$\frac{x}{9} = \frac{\sqrt{3}}{1}$ $\boxed{x = 9\sqrt{3}}$

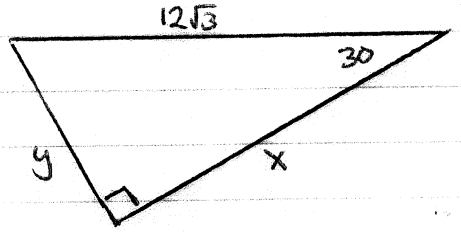
9.



$\frac{x}{3\sqrt{3}} = \frac{1}{\sqrt{3}}$ $x = \frac{3\cancel{\sqrt{3}}}{\cancel{\sqrt{3}}}$ $\boxed{x = 3}$

$\frac{y}{3\sqrt{3}} = \frac{2}{\sqrt{3}}$ $y = \frac{(3\cancel{\sqrt{3}})(2)}{\cancel{\sqrt{3}}}$ $\boxed{y = 6}$

10.

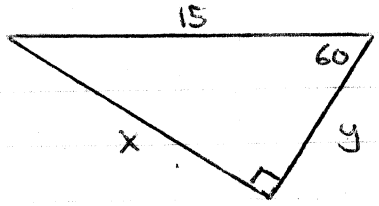


$\frac{x}{12\sqrt{3}} = \frac{\sqrt{3}}{2}$ $x = \frac{(12\sqrt{3})(\sqrt{3})}{2}$ $\boxed{x = 18}$

$\frac{y}{12\sqrt{3}} = \frac{1}{2}$ $y = \frac{12\sqrt{3}}{2}$ $\boxed{y = 6\sqrt{3}}$

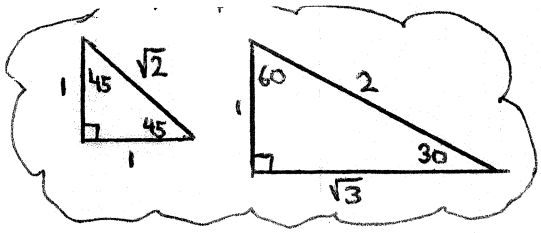
Find the value of each variable. Write answer in simplest radical form.

13.

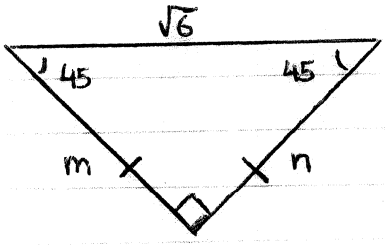


$\frac{x}{15} = \frac{\sqrt{3}}{2}$ $\boxed{x = \frac{15\sqrt{3}}{2}}$

$\frac{y}{15} = \frac{1}{2}$ $\boxed{y = \frac{15}{2}}$



14.

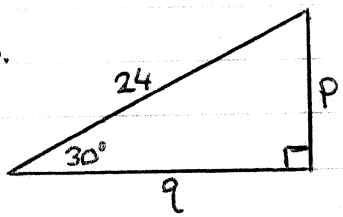


$\frac{m}{\sqrt{6}} = \frac{1}{\sqrt{2}}$

$m = \frac{\sqrt{6}}{\sqrt{2}}$ $\boxed{m = \sqrt{3}}$

Since $n = m$, $\boxed{n = \sqrt{3}}$

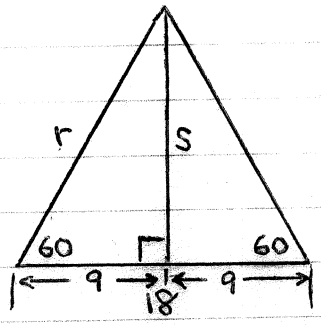
15.



$\frac{p}{24} = \frac{1}{2}$ $\boxed{p = 12}$

$\frac{q}{24} = \frac{\sqrt{3}}{2}$ $\boxed{q = 12\sqrt{3}}$

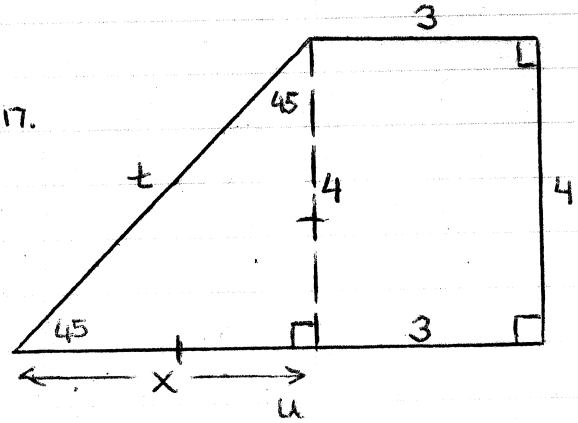
16.



$\frac{r}{9} = \frac{2}{1}$ $\boxed{r = 18}$

$\frac{s}{9} = \frac{\sqrt{3}}{1}$ $\boxed{s = 9\sqrt{3}}$

17.



$x = 4$

$u = x + 3$

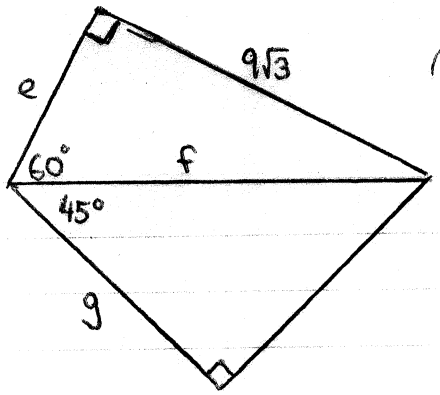
$u = 4 + 3$

$\boxed{u = 7}$

$\frac{t}{4} = \frac{\sqrt{2}}{1}$

$\boxed{t = 4\sqrt{2}}$

18



30-60-90 △

$\frac{e}{9\sqrt{3}} = \frac{1}{\sqrt{3}}$

$e = \frac{9\sqrt{3}}{\sqrt{3}}$

$\boxed{e = 9}$

$\frac{f}{9\sqrt{3}} = \frac{2}{\sqrt{3}}$

$f = \frac{(9\sqrt{3})2}{\sqrt{3}}$

$\boxed{f = 18}$

45-45-90 △

$\frac{g}{18} = \frac{1}{\sqrt{2}}$

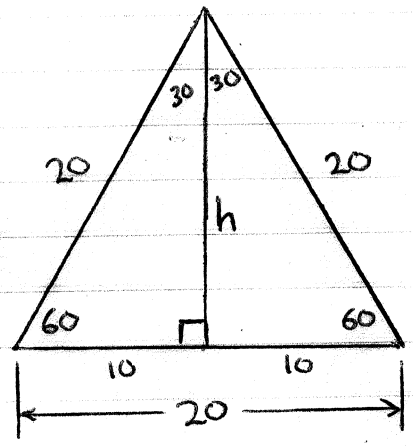
$g = \frac{18}{\sqrt{2}}\left(\frac{\sqrt{2}}{\sqrt{2}}\right)$

$g = \frac{18\sqrt{2}}{2}$

$\boxed{g = 9\sqrt{2}}$

31. If an equilateral triangle has a side length of 20 inches, find the height of the triangle.

Since its equilateral, ALL sides are 20 inches, and all angles are 60°:



Method 1:

$\frac{h}{10} = \frac{\sqrt{3}}{1}$

$\boxed{h = 10\sqrt{3}}$

Method 2:

$\frac{h}{20} = \frac{\sqrt{3}}{2}$

$h = \frac{20\sqrt{3}}{2}$

$\boxed{h = 10\sqrt{3}}$

Method 3:

$10^2 + h^2 = 20^2$

$h^2 = 400 - 100$

$h^2 = 300$

$h = \sqrt{300} = \sqrt{100 \cdot 3}$

$h = \sqrt{100}\sqrt{3}$

$\boxed{h = 10\sqrt{3}}$