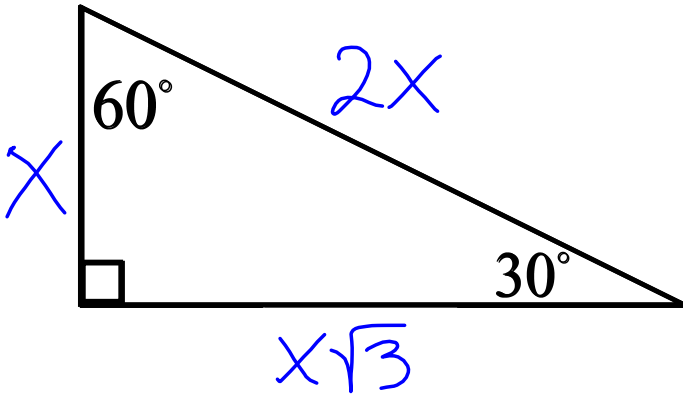
9.2 - Special Right Triangles

angles $30^\circ - 60^\circ - 90^\circ$

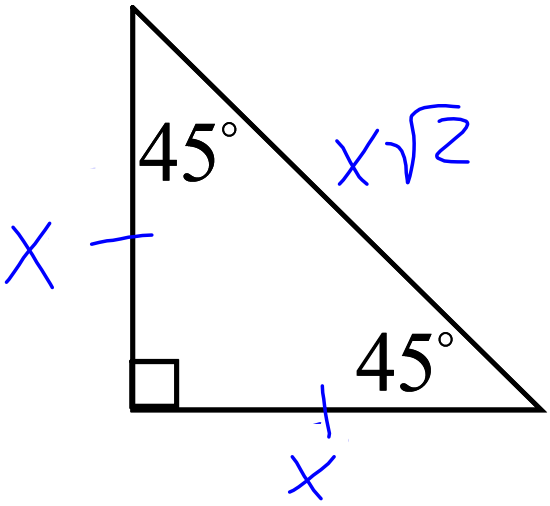
sides $x : x\sqrt{3} : 2x$

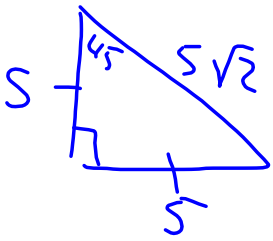


9.2 - Special Right Triangles

angles $45^\circ - 45^\circ - 90^\circ$

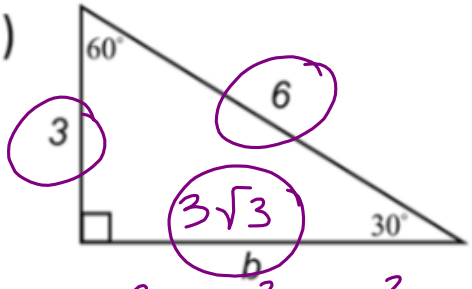
sides $x : x : x\sqrt{2}$





Using Pythagorean Theorem to find the missing side, Explore these 30-60-90 right triangles to discover the pattern in the sides.

1.)



$a^2 + b^2 = c^2$

$3^2 + b^2 = 6^2$

$9 + b^2 = 36$

$-9 \quad -9$

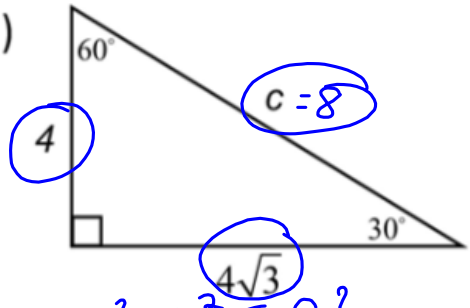
$b^2 = 27$

$b = \sqrt{27}$

$b = \sqrt{9 \cdot 3}$

$b = 3\sqrt{3}$

2.)



$4\sqrt{3} \cdot 4\sqrt{3}$

$16\sqrt{9}$

$16 \cdot 3$

48

$a^2 + b^2 = c^2$

$4^2 + (4\sqrt{3})^2 = c^2$

$16 + 16 \cdot 3 = c^2$

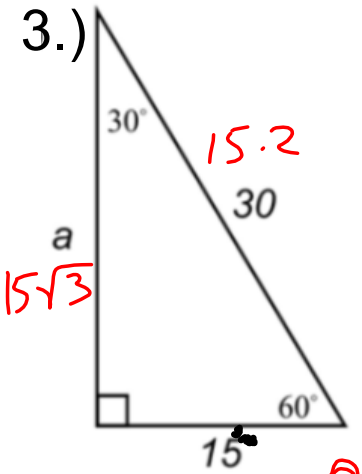
$16 + 48 = c^2$

$64 = c^2$

$\sqrt{64} = c$

$8 = c$

3.)



$a^2 + b^2 = c^2$

$a^2 + 15^2 = 30^2$

$a^2 + 225 = 900$

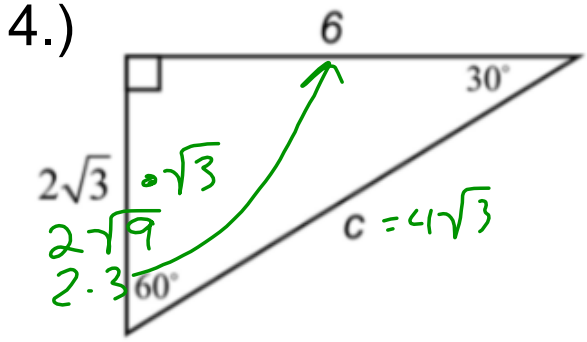
$-225 \quad -225$

$\sqrt{a^2} = \sqrt{675}$

$\sqrt{a^2} = \sqrt{225 \cdot 3}$

$a = 15\sqrt{3}$

4.)



$a^2 + b^2 = c^2$

$6^2 + (2\sqrt{3})^2 = c^2$

$36 + 4 \cdot 3 = c^2$

$36 + 12 = c^2$

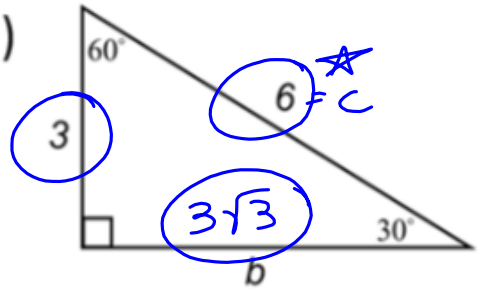
$48 = c^2$

$\sqrt{48} = c$

$c = 4\sqrt{3}$

Using Pythagorean Theorem to find the missing side, Explore these 30-60-90 right triangles to discover the pattern in the sides.

1.)



$a^2 + b^2 = c^2$

$3^2 + b^2 = 6^2$

$9 + b^2 = 36$

$-9 \quad -9$

$b^2 = 27$

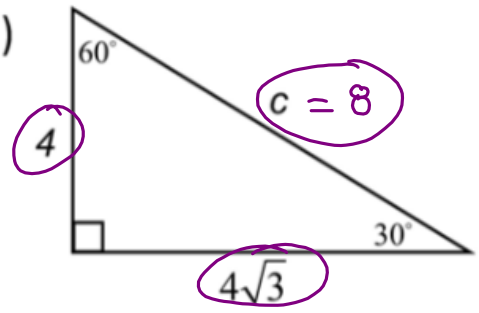
$b = \sqrt{27}$

$b = \sqrt{9 \cdot 3}$

$b = \sqrt{9} \cdot \sqrt{3}$

$b = 3\sqrt{3}$

2.)



$(4)^2 + (4\sqrt{3})^2 = c^2$

$16 + (16 \cdot 3) = c^2$

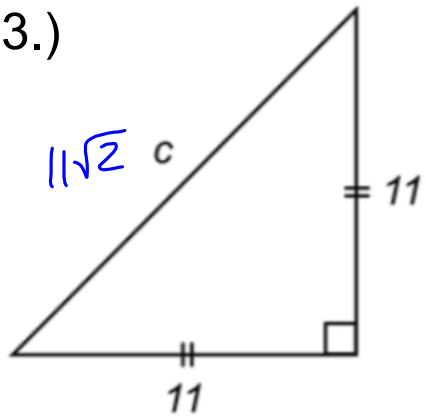
$16 + 48 = c^2$

$64 = c^2$

$c = \sqrt{64}$

$c = 8$

3.)



$a^2 + b^2 = c^2$

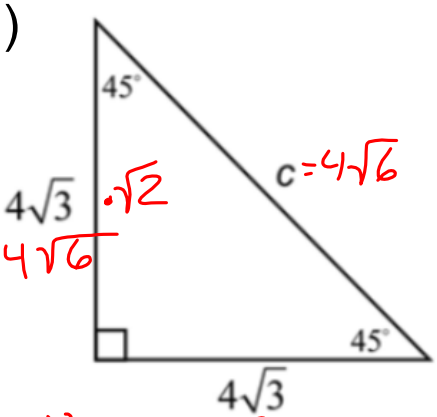
$11^2 + 11^2 = c^2$

$\sqrt{242} = \sqrt{c^2}$

$\sqrt{121} \cdot \sqrt{2} = c$

$11\sqrt{2} = c$

4.)



$(4\sqrt{3})^2 + (4\sqrt{3})^2 = c^2$

$4 \cdot 4 \cdot \sqrt{3} \cdot \sqrt{3}$ $\quad 16 \cdot 3 + 16 \cdot 3 = c^2$

$16 \cdot 9$ $\quad 48 + 48 = c^2$

$16 \cdot 3$

48 $\quad 96 = c^2$

$c = \sqrt{96}$

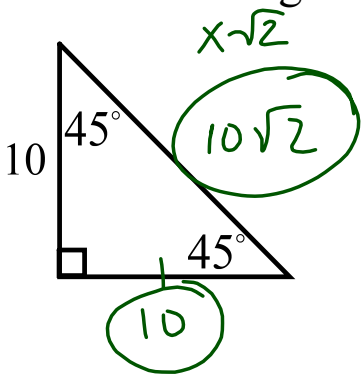
$c = \sqrt{16} \cdot \sqrt{6}$

$c = 4\sqrt{6}$

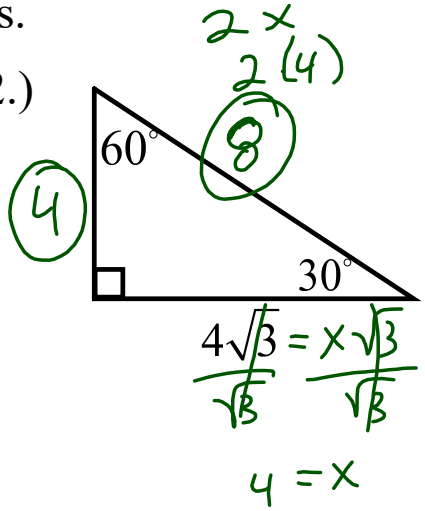
$30-60-90$
$1-\sqrt{3}-2$
$45-45-90$
$1-1-\sqrt{2}$

Find the all missing side lengths.

1.)



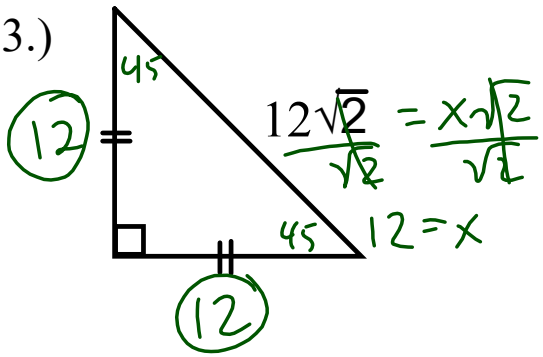
2.)



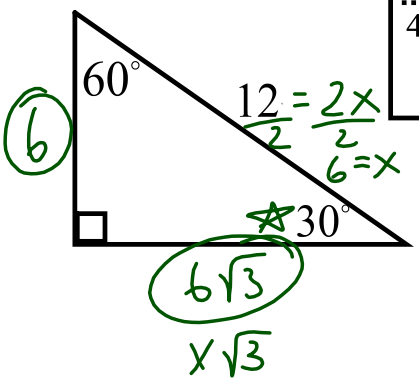
Find the all missing side lengths.

$30-60-90$
$1-\sqrt{3}-2$
$45-45-90$
$1-1-\sqrt{2}$

3.)



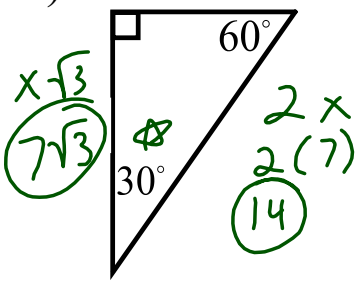
4.)



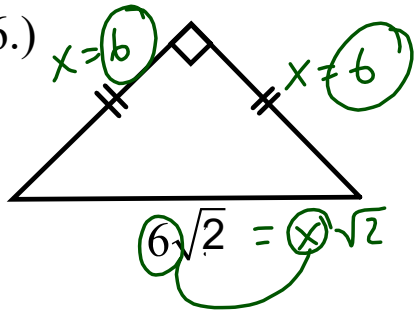
Find the all missing side lengths.

$30-60-90$
$1-\sqrt{3}-2$
$45-45-90$
$1-1-\sqrt{2}$

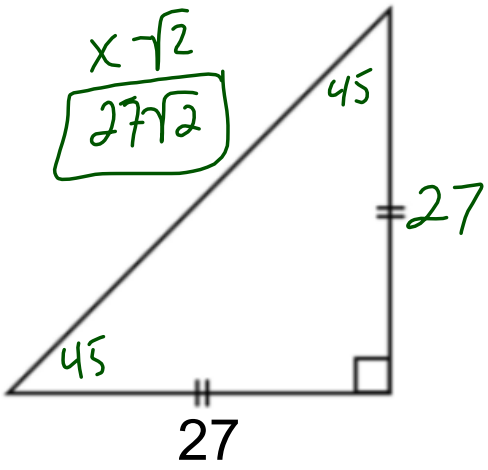
5.)



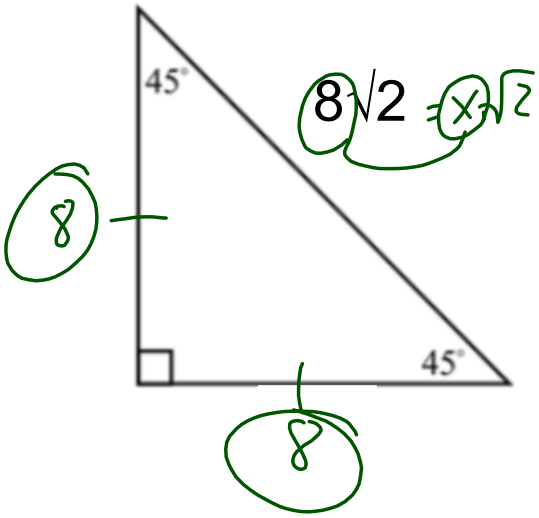
6.)



Example #7



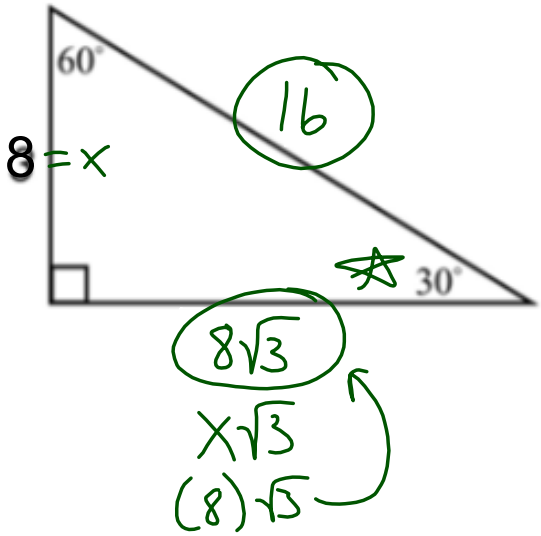
Example #8



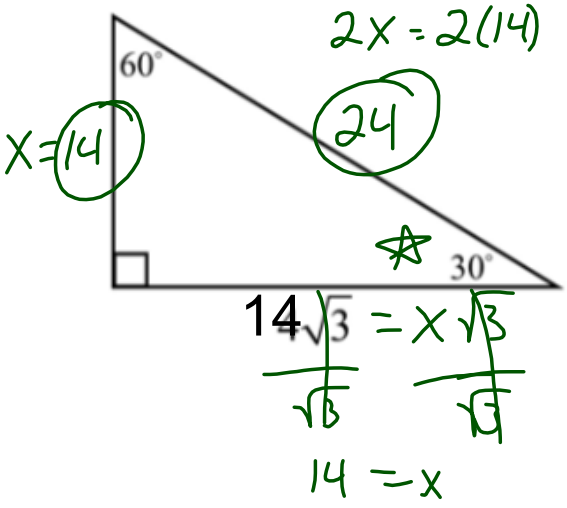
Homework

Find the two missing side lengths.

1.) Given the side opposite 30° for x

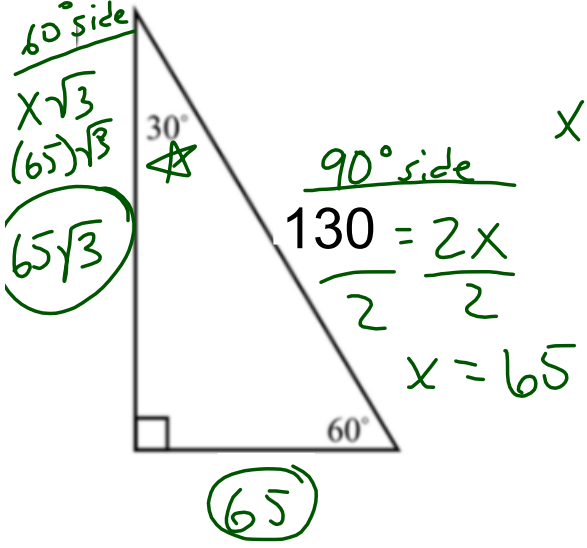


2.) Given the side opposite 60° as x√3 to find x

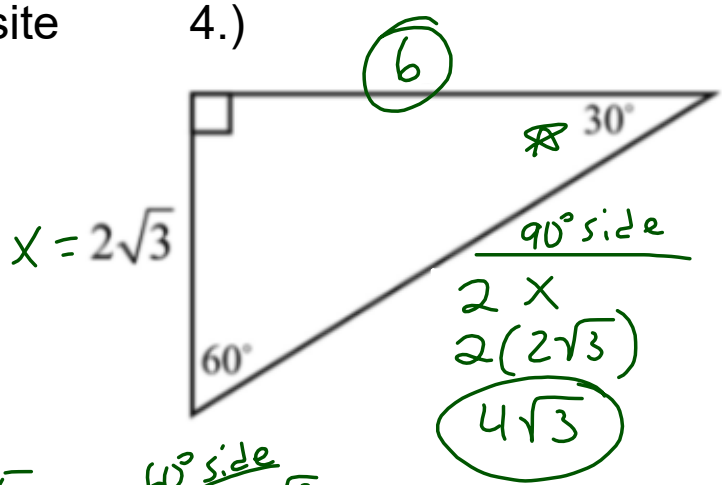


Find the two missing side lengths.

3.) Given the side opposite 90° as 2x to find x



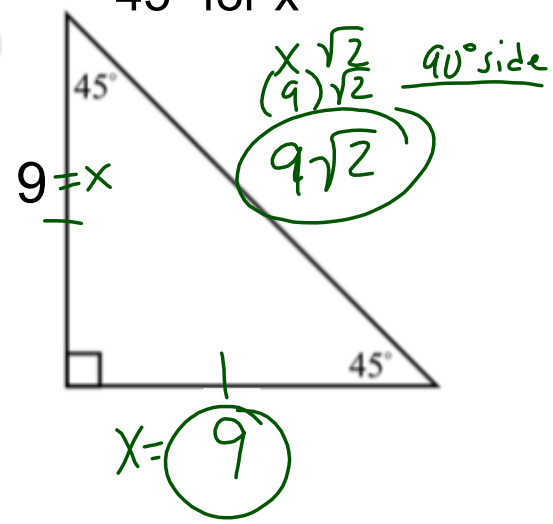
4.)



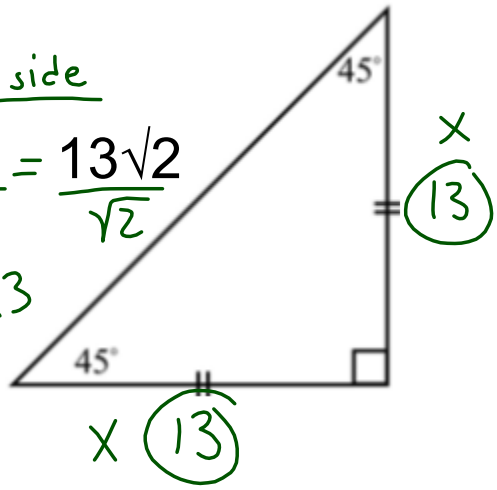
60° side
x√3
(2√3)√3
2√9
2·3
6

Find the two missing side lengths.

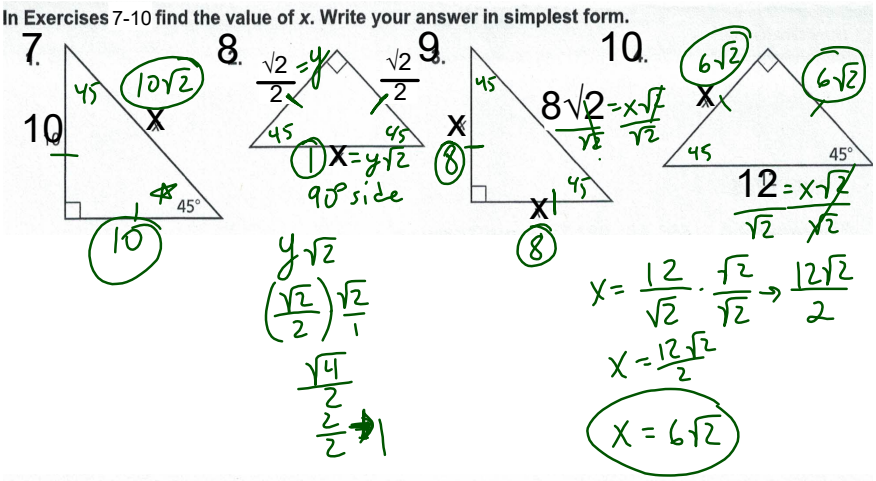
5.)Given the side opposite 45° for x



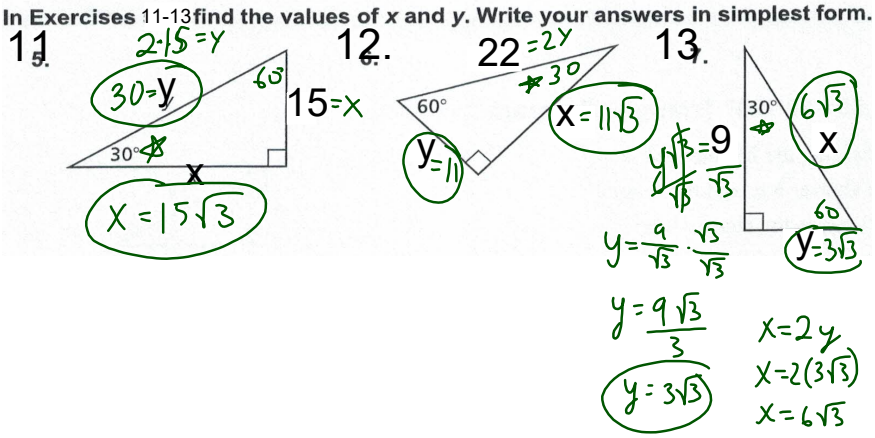
6.)Given the side opposite 90° as x√2 to find x



In Exercises 7-10 find the value of *x*. Write your answer in simplest form.

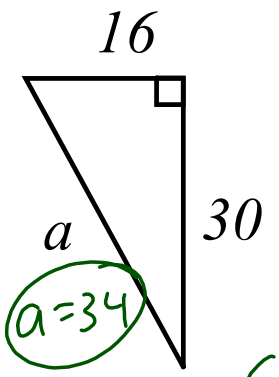


In Exercises 11-13 find the values of *x* and *y*. Write your answers in simplest form.



Find the values of the missing variables and circle the method you used.

14.)



Pythagorean Theorem

Triple/Family

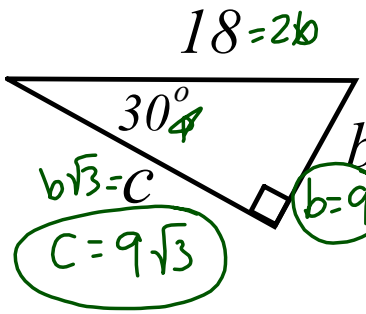
Special Right Triangle

8 : 15 : 17

↳ scale factor of 2

16 : 30 : 34

15.)



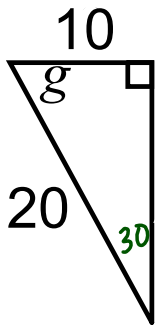
Pythagorean Theorem

Triple/Family

Special Right Triangle

Find the values of the missing variables and circle the method you used.

16.)



Pythagorean Theorem

Triple/Family

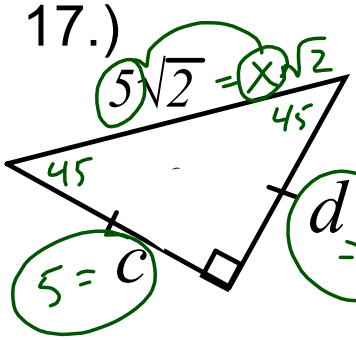
Special Right Triangle

10 · 2 = 20

So 10 is opposite 30° angle side

f = 10√3

17.)



Pythagorean Theorem

Triple/Family

Special Right Triangle