Name: _____ Hr: _____

Converse of the Pythagorean Theorem and Special Right Triangle Notes

Converse of the Pythagorean Theorem:

Use the Pythagorean Thm to see if a triangle is a right triangle

Pythagorean Triple:

3 whole, positive integers — a, b, c — such that $a^2 + b^2 = c^2$

Example 1

Is a triangle with sides of length 60 cm, 80 cm, and 100 cm (c) a right triangle? Do they form a Pythagorean Triple?

$60^2 + 80^2 \stackrel{?}{=} 100^2$

$3600 + 6400 \stackrel{?}{=} 10000$

$10000 = 10000$ ✓

right triangle? yes

Pythagorean Triple? yes

Example 2

Is a triangle with sides of length 45 cm, 60 cm, and 76 cm (c) a right triangle? Do they form a Pythagorean Triple?

$45^2 + 60^2 \stackrel{?}{=} 76^2$

$2025 + 3600 \stackrel{?}{=} 5776$

$5625 \neq 5776$

right triangle? no

Pythagorean Triple? no

Example 3

Is a triangle with sides of length 2 cm, $\sqrt{8}$ cm, and $\sqrt{12}$ cm (c) a right triangle? Do they form a Pythagorean Triple?

$2^2 + (\sqrt{8})^2 \stackrel{?}{=} (\sqrt{12})^2$

$4 + 8 \stackrel{?}{=} 12$

$12 = 12$ ✓

right △? yes

Pythagorean Triple? no

(not whole #s)

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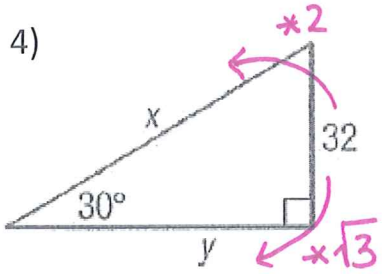
Special Right Triangles

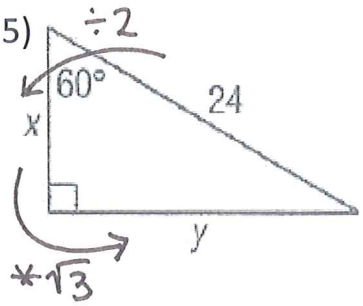
4)



$x = 64$

$y = 32\sqrt{3}$

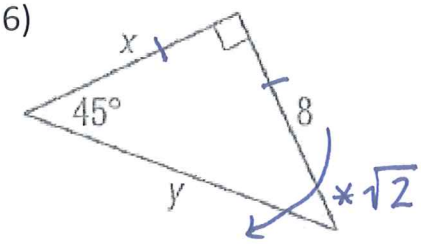
5)



$x = 12$

$y = 12\sqrt{3}$

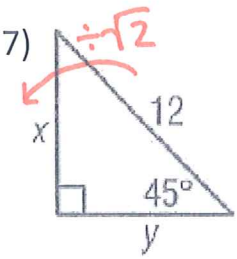
6)



$x = 8$

$y = 8\sqrt{2}$

7)

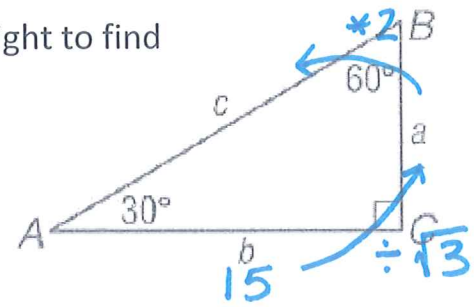


$x = \frac{12}{\sqrt{2}} = \frac{12}{2}\sqrt{2}$

$x = 6\sqrt{2}$

$y = 6\sqrt{2}$

8) Use the figure to the right to find a and c if $b = 15$.

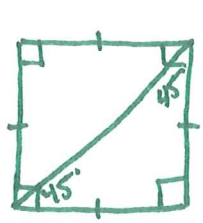


$a = \frac{15}{\sqrt{3}} = \frac{15}{3}\sqrt{3}$

$a = 5\sqrt{3}$

$b = 10\sqrt{3}$

9) The perimeter of a square is 30 inches. a) Find the length of one side. b) Find the length of the diagonal.

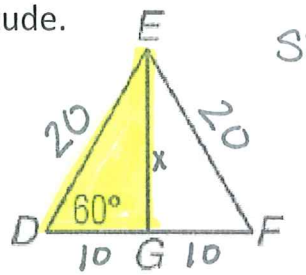


a) $\frac{30}{4} = 7.5$ in. or $\frac{15}{2}$ in.

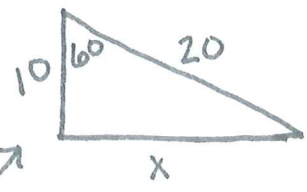
b) It's a 45-45-90 △ so...

$7.5\sqrt{2}$ in. or $\frac{15}{2}\sqrt{2}$ in.

10) The perimeter of the equilateral triangle below is 60 meters. Find the length of the altitude.



Side length = $\frac{60}{3} = 20$



$x = 10\sqrt{3}$ in