

1) Find the value of  $x$ ,  $y$ , and  $z$ .

alt

$$\frac{8}{4} = \frac{4}{z}$$

$$\frac{8z}{8} = \frac{16}{8}$$

$z = 2$

leg 1

$$\frac{8}{x} = \frac{x}{10}$$

$$x^2 = 80$$

$x = 4\sqrt{5}$

leg 2

$$\frac{z}{y} = \frac{y}{10}$$

$$y^2 = 20$$

$y = 2\sqrt{5}$

2) Find the value of  $x$ .

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

$$8^2 = x^2 + 4^2$$

$$64 = x^2 + 16$$

$$\begin{array}{r} 64 \\ - 16 \\ \hline 48 \end{array} \qquad \begin{array}{r} x^2 + 16 \\ - 16 \\ \hline x^2 \end{array}$$

$$\sqrt{48} = \sqrt{x^2}$$

$4\sqrt{3} = x$

3) Determine whether these are the sides of a right  $\Delta$ , acute  $\Delta$ , or obtuse  $\Delta$ .

6,  $6\sqrt{3}$ , 12  
10.4

$c^2 = a^2 + b^2$  Rt $\Delta$

$c^2 > a^2 + b^2$  Obtuse

$c^2 < a^2 + b^2$  acute

$12^2 ? 6^2 + (6\sqrt{3})^2$

144       $36 + 108$

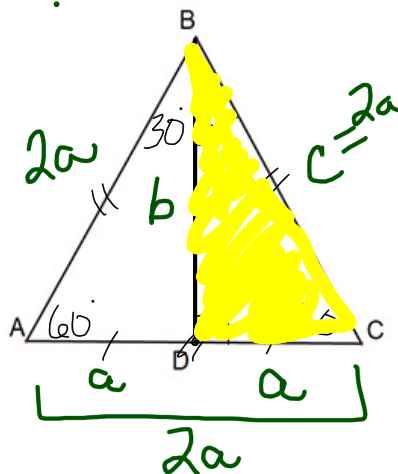
$144 = 144$

Rt.  $\Delta$

NOTES Special Right Triangles

$\Delta ABC$  is equilateral.

- 1) What are the measures of  $\angle A$ ,  $\angle B$ , &  $\angle C$ ?  $60^\circ$
- 2) D is the midpoint of AC. Draw BD. Is  $\Delta ADB \cong \Delta CDB$ ? Why or Why not?  $SSS$   
*Yes.*
- 3) Mark AD with an "a". Mark BD with a "b". Mark BC with a "c". How long is DC?  $a$
- 4) How long is AC? What does this make "c" equal to?



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

$(2a)^2 = a^2 + b^2$

$4a^2 = a^2 + b^2$

$$\begin{array}{r} 4a^2 = a^2 + b^2 \\ -1a^2 \quad -a^2 \\ \hline \sqrt{3a^2} = \sqrt{b^2} \end{array}$$

$a\sqrt{3} = b$

$a = 5, b = 5\sqrt{3}$

$a = 12, b = 12\sqrt{3}$   
 $c = 24$

30-60-90  $\Delta$ s

$$ll = sl\sqrt{3}$$

$$hyp = sl \cdot 2$$

**EX 1**

$ll = sl\sqrt{3}$   
 $x = 5\sqrt{3}$

$hyp = sl \cdot 2$   
 $y = 5 \cdot 2$   
 $y = 10$

**EX 2**

$ll = sl\sqrt{3}$   
 $6\sqrt{3} = x\sqrt{3}$   
 $6 = x$

$hyp = sl \cdot 2$   
 $y = x \cdot 2$   
 $y = 6 \cdot 2$   
 $y = 12$

**EX 3**

$ll = sl \sqrt{3}$   
 $12 = x \sqrt{3}$   
 $\frac{12}{\sqrt{3}} = \frac{x \sqrt{3}}{\sqrt{3}}$   
 $4\sqrt{3} = x$

$hyp = sl \cdot 2$   
 $y = x \cdot 2$   
 $y = 4\sqrt{3} \cdot 2$   
 $y = 8\sqrt{3}$

**EX 4**

$ll = sl \sqrt{3}$   
 $y = x \sqrt{3}$   
 $y = \frac{15}{2} \sqrt{3}$   
 $y = \frac{15\sqrt{3}}{2}$

$hyp = sl \cdot 2$   
 $15 = x \cdot 2$   
 $\frac{15}{2} = x$

**Discovery Activity**  $c^2 = a^2 + b^2$

Row 1 (Left to right)

1

$c = \sqrt{2}$

2

$c = 2\sqrt{2}$

Row 3

3

$c = 3\sqrt{2}$

$\sqrt{c^2} = \sqrt{18}$

Row 4

4

$c = 4\sqrt{2}$

$c^2 = 4^2 + 4^2$

Row 5

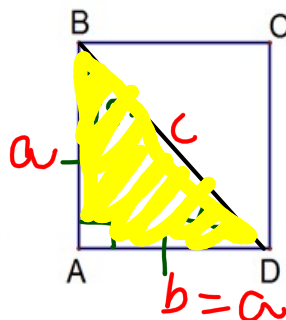
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$c = 5\sqrt{2}$

10, 10,  $10\sqrt{2}$

Quad.  $ABCD$  is a square.

- 1) What are the measures of  $\angle A$ ,  $\angle B$ ,  $\angle C$ , &  $\angle D$ ?  $90^\circ$
- 2) Draw  $BD$ . What is the measure of  $\angle ABD$  &  $\angle BDA$ ?  $45^\circ$
- 3) Mark  $AB$  with an " $a$ ". Mark  $AD$  with a " $b$ ". Mark  $BD$  with a " $c$ ". What is true about  $AB$  and  $AD$ ?  $\cong$



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

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

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

$$c = a\sqrt{2}$$

$$a = 10$$

$$b = 10$$

$$c = 10\sqrt{2}$$


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$$a = 40$$

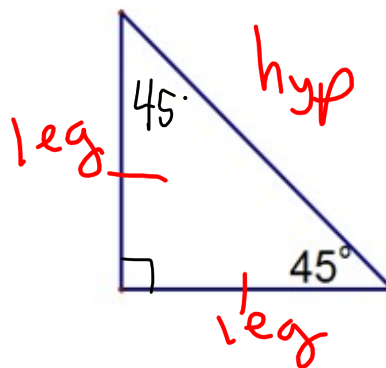
$$b = 40$$

$$c = 40\sqrt{2}$$

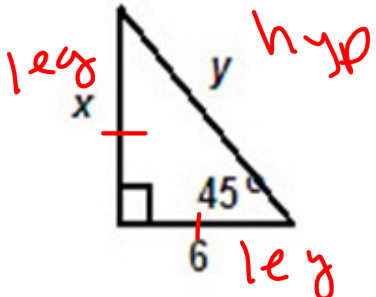
45-45-90  $\Delta$ s

$$\text{legs} \cong$$

$$\text{hyp} = \text{leg}\sqrt{2}$$



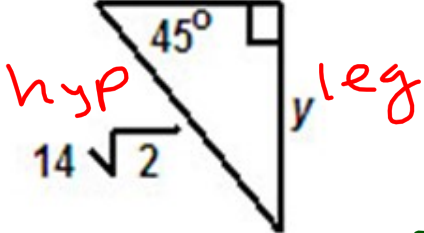
**EX 5**



leg  $x$       hyp  $y$   
leg  $6$

leg  $\hat{=}$       hyp = leg  $\sqrt{2}$   
 $x = 6$        $y = 6\sqrt{2}$

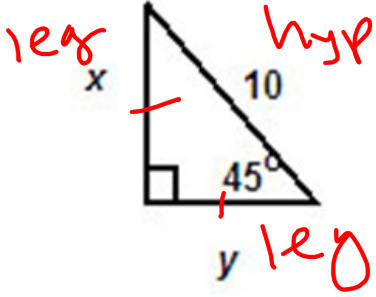
**EX 6**      x leg



hyp  $14\sqrt{2}$       leg  $y$

leg  $\hat{=}$       hyp = leg  $\sqrt{2}$   
 $x = y$        $\frac{14\sqrt{2}}{\sqrt{2}} = \frac{y\sqrt{2}}{\sqrt{2}}$   
 $x = 14$        $14 = y$

**EX 7**



leg  $x$       hyp  $10$   
leg  $y$

leg  $\hat{=}$       hyp = leg  $\sqrt{2}$   
 $x = y$        $\frac{10}{\sqrt{2}} = \frac{x\sqrt{2}}{\sqrt{2}}$   
 $y = 5\sqrt{2}$        $5\sqrt{2} = x$

$30-60-90 \Delta s$	$45-45-90 \Delta s$
$ll = sl\sqrt{3}$	legs $\approx$
$hyp = sl \cdot 2$	$hyp = leg\sqrt{2}$

Worksheet Special Right Triangles