$a^2 + \cancel{10} = 110$
$\quad -10 \quad -10$
$\sqrt{a^2} = \sqrt{100}$
$a = 10$

Lesson 10-1

Squares & Square Roots (p537-542)

Square: to the second power

2 #

ex) $7^2 = 7 \cdot 7 = \boxed{49}$ $13^2 = 13 \cdot 13 = 169$ $a^2 = a \cdot a$

the opposite of square

Square Root: one of the two equal factors

$\sqrt{}$

ex) $\sqrt{49} = 7$ $\sqrt{169} = 13$ $\sqrt{a^2} = a$

Find each square root.

ex) $+\sqrt{9} = 3$

ex) $-\sqrt{64} = -8$

ex) $\sqrt{-36}$ = Not possible

ex) $\pm\sqrt{4} = \begin{cases} +\sqrt{4} = \boxed{2} \\ -\sqrt{4} = \boxed{-2} \end{cases}$

$1^2 = 1$
$2^2 = 4$
$3^2 = 9$
$4^2 = 16$
$5^2 = 25$
$6^2 = 36$
$7^2 = 49$
$8^2 = 64$
$9^2 = 81$
$10^2 = 100$
$11^2 = 121$
$12^2 = 144$
$13^2 = 169$
$14^2 = 196$
$15^2 = 225$

Estimate each square root to the nearest integer.

ex) $\sqrt{33} \approx \boxed{6}$

about

$\sqrt{25}$ $\sqrt{33}$ $\sqrt{36}$
5 6

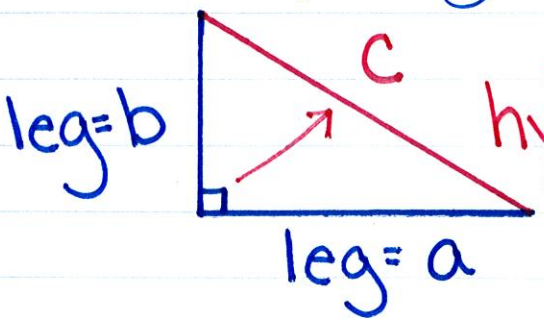
ex) $\sqrt{125} \approx \boxed{11}$

$\sqrt{121}$ $\sqrt{125}$ $\sqrt{144}$
11 12

Lesson 10-4

// The Pythagorean Theorem (p558-563)

... only for right triangles



... always opposite the right angle

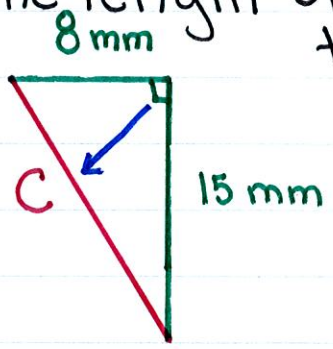
hypotenuse: **longest** side of a right triangle

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

The Pythagorean Theorem

Find the length of the hypotenuse. Round to the nearest tenth if necessary.

ex)



$a^2 + b^2 = c^2$ ① Write the formula.

$8^2 + 15^2 = c^2$ ② Substitute the numbers.

$64 + 225 = c^2$ ③ Solve for the variable.

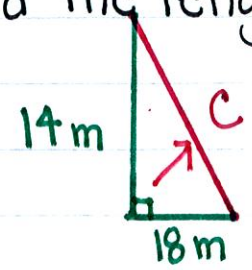
$\sqrt{289} = \sqrt{c^2}$

$17.0 \text{ mm} = c$

... Don't forget your label.

Find the length of the hypotenuse. Round to the nearest tenth if necessary.

ex)

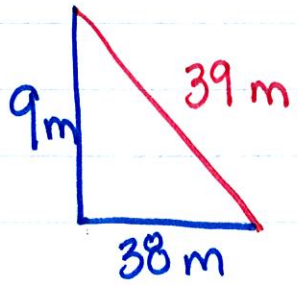


$$a^2 + b^2 = c^2$$
$$14^2 + 18^2 = c^2$$
$$196 + 324 = c^2$$
$$\sqrt{520} = \sqrt{c^2}$$

$$\boxed{22.8 = c \text{ m}}$$

The lengths of the three sides of a triangle are given. Determine whether each triangle is a right triangle.

ex) $a = 9$ m $b = 38$ m $c = 39$ m

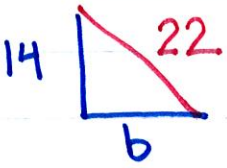


$$a^2 + b^2 = c^2$$
$$9^2 + 38^2 = 39^2$$
$$81 + 1{,}444 = 1{,}521$$
$$1{,}525 \neq 1{,}521$$

No ☹

If c is the hypotenuse, find the missing measure. Round to the nearest tenth if necessary.

ex) $a = 14$ $b = ?$ $c = 22$



$$a^2 + b^2 = c^2$$
$$14^2 + b^2 = 22^2$$
$$\cancel{196} + b^2 = 484$$
$$-\cancel{196} \qquad -196$$
$$\sqrt{b^2} = \sqrt{288}$$

$$b = 17.0 \text{ units}$$

Lesson 10-5

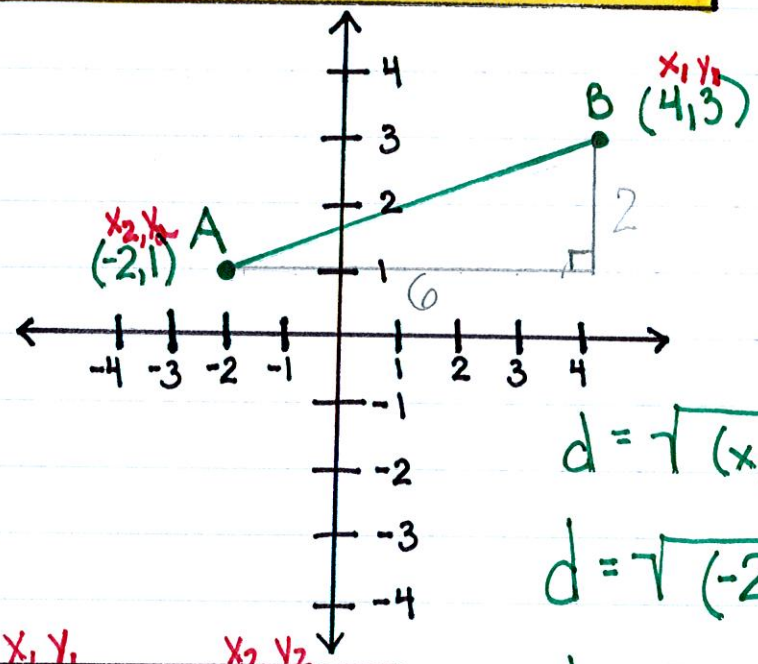
// The Distance Formula (p567-570)
(based on the Pythagorean Theorem)

The Distance Formula: the distance = d (the hypotenuse) between any 2 points on a graph.

$$\boxed{d=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}}$$

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

$\sqrt{a^2+b^2}=d$



$d=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

$d=\sqrt{(-2-4)^2+(1-3)^2}$

$d=\sqrt{(-6)^2+(-2)^2}$

$d=\sqrt{36+4}$

$d=\sqrt{40}\approx 6.3$

ex) A(3,1) B(2,5)

x_1, y_1 x_2, y_2

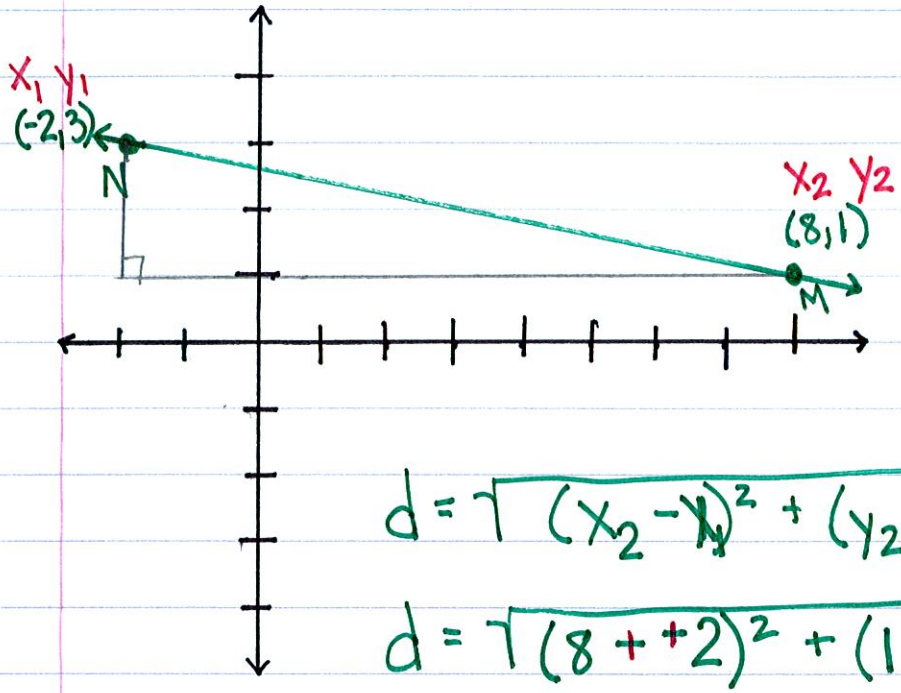
$d=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

$d=\sqrt{(2-3)^2+(5-1)^2}$

$d=\sqrt{(-1)^2+4^2}$

$d=\sqrt{1+16}$

$d=\sqrt{17}\approx 4.1$



$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$d = \sqrt{(8 + {}^{+}2)^2 + (1 - 3)^2}$$

$$d = \sqrt{10^2 + (-2)^2}$$

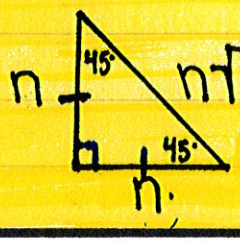
$$d = \sqrt{100 + 4}$$

$$d = \sqrt{104} \approx 10.2$$

Lesson 10-6

// Special Right Triangles (p571-576)

45°-45°-90° Triangle



hyp = leg × $\sqrt{2}$

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

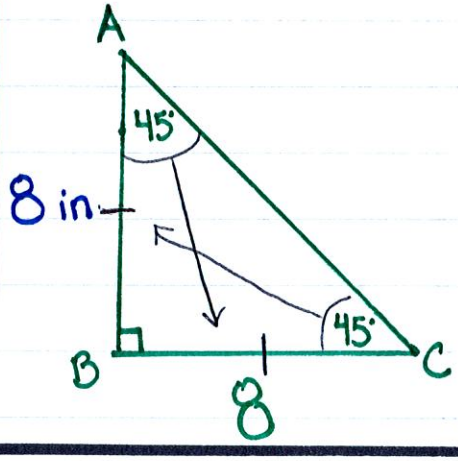
$3^2+3^2=c^2$

$9+9=c^2$

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

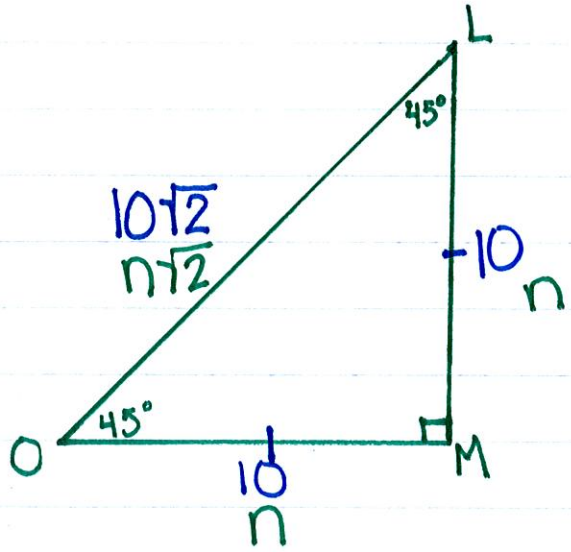
$3\sqrt{2}=c$

ex)



$\boxed{BC = 8\text{ in}}$ $\boxed{AC = 8\sqrt{2}\text{ in}}$

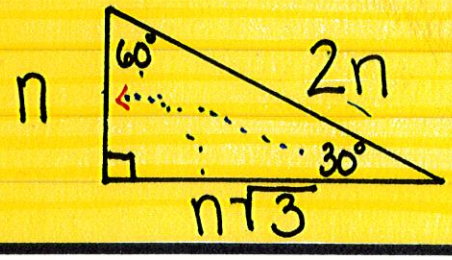
ex)



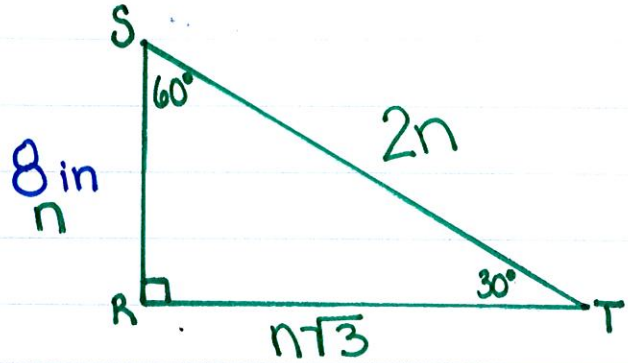
LM = 10 units

OM = 10 units

30°-60°-90° Triangle

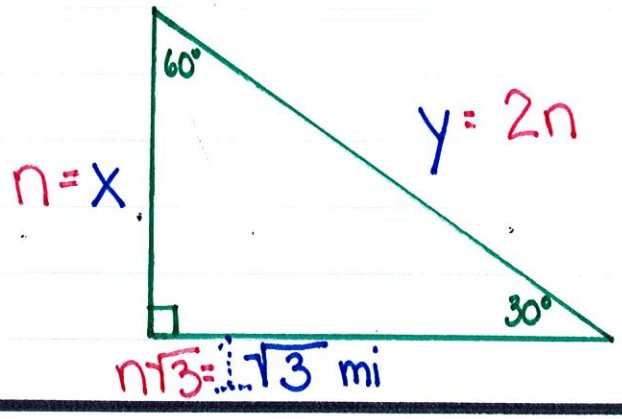


ex)



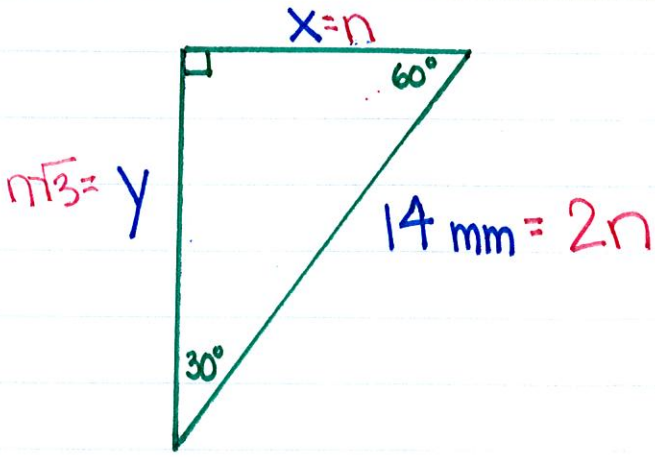
RT = $8\sqrt{3}$ in ST = 16 in

ex)



x = 1 mi y = 2 mi

ex)



x = 7 mm y = $7\sqrt{3}$ mm