Linear Equations

An equation is an open sentence that states that two algebraic expressions are equal. An equation is linear if the variables on either side of the equal sign have a highest exponent value or degree of one.

We keep an equation in balance by performing inverse operations to both sides of an equation.

3 Types of Equations:

1. Conditional: an equation that is true for only some values of the variable. Ex: $8x = 16$ 1 solution
2. Identities: an equation that is true for all values of the variables. Ex: $4x + 2x = 6x$ ∞ many
3. Contradiction: When a determined value does not satisfy the equation (make it true) or when an equation ends up having no variables. Ex: $1 + x = x$

$-x \quad -x$

$1 \neq 0$ no solution

Properties of Equality: WB pp. 46 and 48

In the given solution, state the property being used:

$(a + 8) - 5 = 17$	Given
$a + (8 - 5) = 17$	associative property
$a + 3 = 17$	Simplify
$a + 3 - 3 = 17 - 3$	subtraction property of equality
$a + 0 = 17 - 3$	additive inverse
$a = 17 - 3$	additive identity
$a = 14$	Simplify

Simplify 2(4 + 1) - 8x and name the property that justifies each step.

$2(4x + 1) - 8x$	Given
$(8x + 2) - 8x$	Distributive Property
$(2 + 8x) - 8x$	Commutative Property of Addition
$2 + (8x - 8x)$	Associative Property
$2 + 0$	Additive Inverse
2	Additive Identity

Classwork: WB pp. 47 - 51
HW: WB p. 48 #s 9, 10, 19 -23 and p. 51 #s 14 - 22

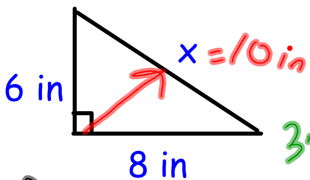
(Math 8 HW: p125
p129 #s 1-8 odd
due Fri

Pythagorean Theorem

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

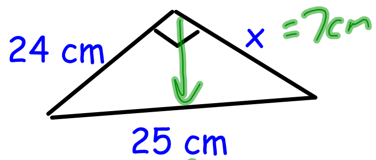
a and b represent the legs of a right triangle
and c represent the hypotenuse
↳ across from the right ∠
largest side

Find the length of the missing side:



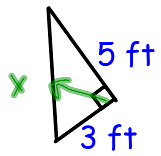
3-4-5 x 2

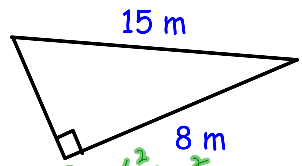
$a^2 + b^2 = c^2$
$6^2 + 8^2 = x^2$
$36 + 64 = x^2$
$\sqrt{100} = \sqrt{x^2}$
$10 = x$



$a^2 + b^2 = c^2$
$24^2 + x^2 = 25^2$
$576 + x^2 = 625$
$-576 \qquad -576$
$\sqrt{x^2} = \sqrt{49}$
$x = 7$

Find the length of the missing sides:





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

$3^2+5^2=x^2$

$9+25=x^2$

$\sqrt{34}=\sqrt{x^2}$

$x=\sqrt{34}\approx 5.\_$

$5^2=25$

$6^2=36$

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

$8^2+x^2=15^2$

$64+x^2=225$

$-64 \quad -64$

$\sqrt{x^2}=\sqrt{161}$

$x=\sqrt{161}\approx 12.\_$

12.8

11.3

13.1

12.2

$12^2=144$

$13^2=169$

144 161 169

12 13

Pythagorean Triples (Triplets)

The following triples, and any multiple, always make a right triangle.

3, 4, 5

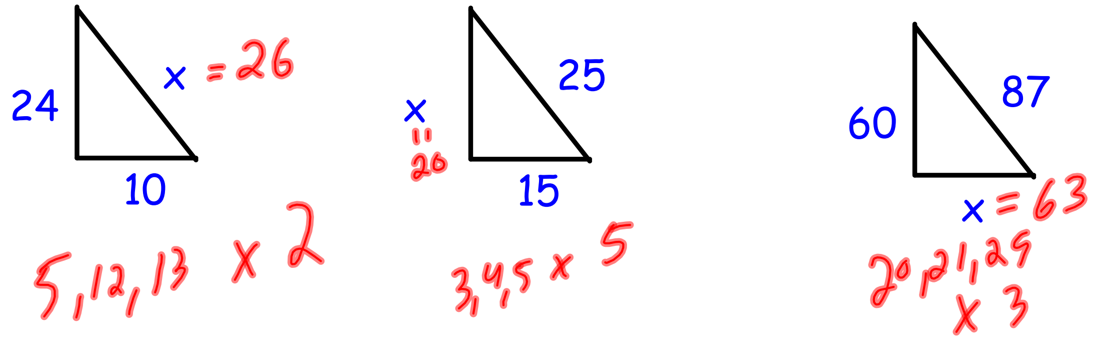
5, 12, 13

7, 24, 25

8, 15, 17

20, 21, 29

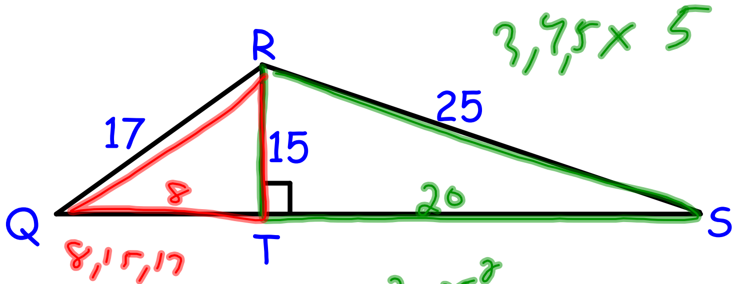
Find the missing length of the triangle:



Pythagorean Theorem Problems Day 2

Find the length of QS.

$\overline{QS} = 28$



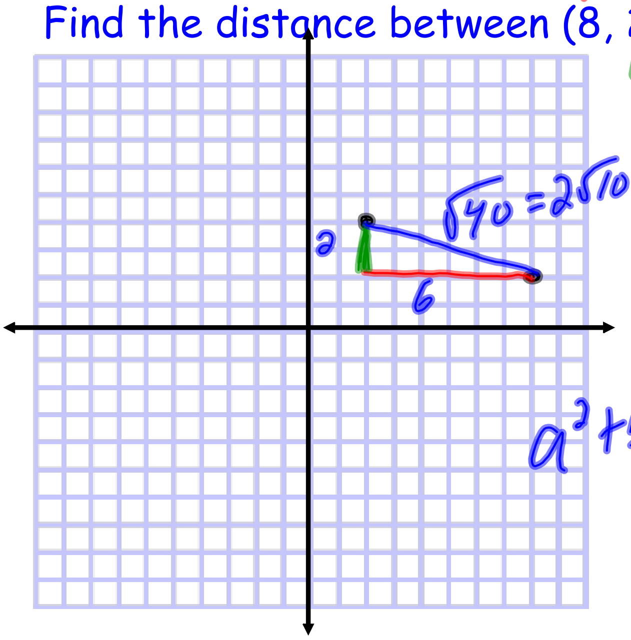
$15^2 + x^2 = 25^2$

$225 + x^2 = 625$

$\sqrt{x^2} = \sqrt{400}$

$x = 20$

Find the distance between (8, 2) and (2, 4).



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

$(8-2)^2$ $(2-4)^2$

6^2 $(-2)^2$

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

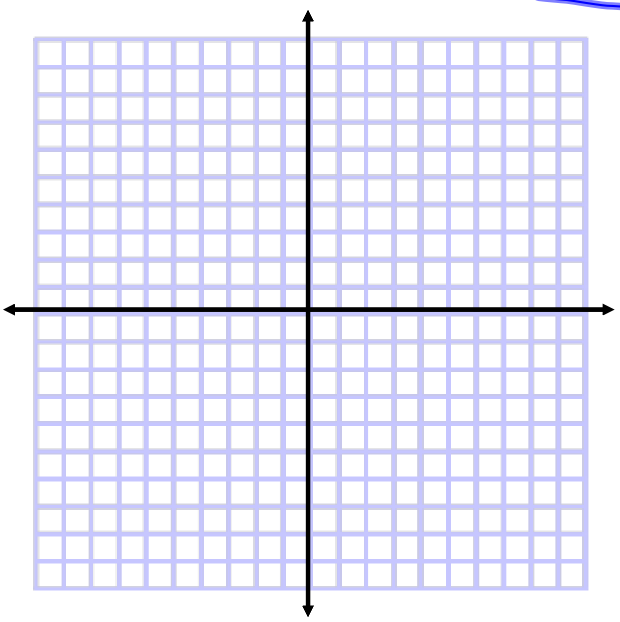
$$d=\sqrt{36+4}$$

$$\sqrt{40}$$

$\sqrt{4}\ \sqrt{10}$

$\sqrt{4} = 2$

Find the distance between (-5, -4) and (-2, -1).



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

$9+9=c^2$

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

$\sqrt{9}\ \sqrt{2}$

$\sqrt{9} = 3$

$3\sqrt{2}=c$