Date:_____

10.1 Modeling and Solving One Step Equations

What value of x would make each equation true?

solving means "what makes the equation true"

$3x = 12$ $\qquad$ $\frac{x}{3} = 5$

$x = 4$ $\qquad$ $x = 15$

"=" signs line up.

How can you check to make sure your answer is correct?

check by substitution.

$3(4) = 12$

$12 = 12$

substitution in bracket

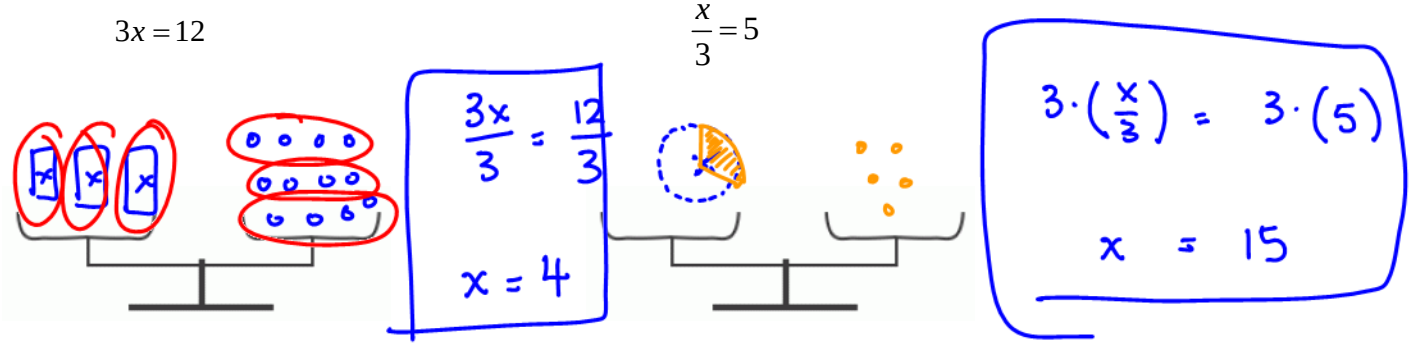
- it is important to show substitution correctly.

Solving by inspection is also called: guess and check.

* Solving by Opposite Operations

An equation can also be solved using a diagram:

$3x = 12$ $\qquad$ $\frac{x}{3} = 5$



Solving by inspection can become more difficult if the numbers don't work out nicely:

12x = 726 a ÷ 14 = 3.72

① solve by isolating the variable
② use opposite operations
③ do the same steps to both sides of the equation.

The best way to solve an equation is to apply the opposite process.

Example:

a) $4x = 8$

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

$x = 2$

b) $3x = -15$

$\frac{3x}{3} = \frac{-15}{3}$

$x = -5$

c) $7a = 21$

$\frac{7a}{7} = \frac{21}{7}$

$a = 3$

d) $\frac{x}{4} = 2$

$4\left(\frac{x}{4}\right) = 4(2)$

$x = 8$

e) $\frac{a}{5} = -4$

$\frac{a}{5} \cdot 5 = -4.5$

$a = -20$

f) $\frac{x}{2} = \frac{3}{4}$

$2 \cdot \left(\frac{x}{2}\right) = \frac{2}{1}\left(\frac{3}{4}\right)$

$x = \frac{6}{4}$

$x = \frac{3}{2}$

g) $\frac{x}{-2} = 7$

$-2 \cdot \frac{x}{-2} = -2 \cdot 7$

$x = -14$

h) $\frac{-a}{3} = 3$

$-3 \cdot \left(\frac{-a}{3}\right) = -3 \cdot (3)$

$+a = -9$

or

$3\left(\frac{-a}{3}\right) = 3 \cdot 3$

$-a = 9$

$a = -9$

Examples:

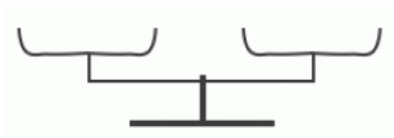
Write an equation and solve using the opposite operation for each of the following:

v = 2 times t

The average temperature in Vancouver is twice as warm as the temperature in Toronto. If the temperature in Vancouver is 12°C, what is the temperature in Toronto?

$v = 2t$

$12 = 2t$



$\frac{12}{2} = \frac{2t}{2}$

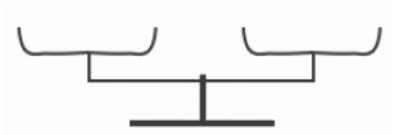
$6 = t$

The temperature in Toronto is 6°

Alejandro is making bead necklaces. He has 144 beads which he will use to make 9 necklaces. How many beads are on each necklace?

b = # beads on one necklace.

$9b = 144$



$\frac{9b}{9} = \frac{144}{9}$

$b = 16$

There are 16 beads on each necklace

How can you check to see if your answer is correct?

Solve:

$6x = -42$

$\frac{6x}{6} = \frac{-42}{6}$

$x = -7$

Check: by substitution

$6(-7) = -42$

$-42 = -42$ ✓

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Quiz next class.