Date: ___(KEY)___

10.1 notes: Modeling and Solving a One-Step Equation

Review:

How is an equation different from an expression?

An equation has an equals sign

Examples:

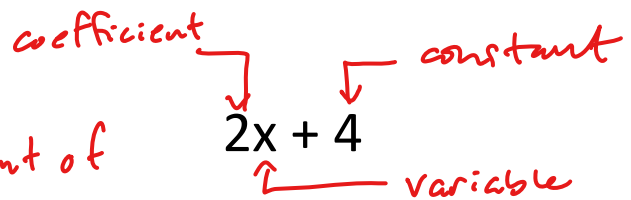Expression: $2x + 1$ Equation: $y = 2x + 1$

Important Terms

Coefficient - a number in front of a variable.

Variable - a letter (an unknown number)

Constant - a number that is unattached to a variable

coefficient — constant

$$2x + 4$$

variable

Identify the coefficient, variable and constant in each expression:

$3x - 2$	$-x + 1$	$5 - 2x$	$x - 1$
Co-eff: 3	co-eff: -1	Co-eff: -2	Coeff: none (1)
var: x	var: x	var: x	var: x
con: -2	con: 1	con: 5	con: -1

We saw that an equation can be solved by inspection.

$$\frac{3x}{3} = \frac{12}{3} \Rightarrow 4$$

$$x = 4$$

$$\frac{x}{3} = 5 \Rightarrow 15$$
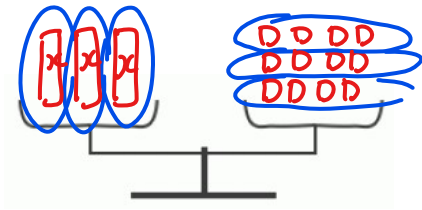
$\times 3 \quad \times 3$

$$x = 15$$

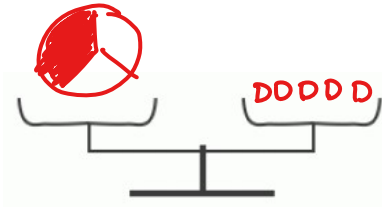An equation can also be solved using a diagram:

$3x = 12$

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

$x = 4$

$x = 15$

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

Example:

a) $4x = 8$

$\frac{}{4} \quad \frac{}{4}$

$x = 2$

b) $3x = -15$

$\frac{}{3} \quad \frac{}{3}$

$x = -5$

c) $7a = 21$

$\frac{}{7} \quad \frac{}{7}$

$a = 3$

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

$\times 4 \quad \times 4$

$x = 8$

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

$\times 5 \quad \times 5$

$a = 20$

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

$\times 2 \quad \times 2$

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

$\frac{3}{4} \times 2$

$= \frac{3}{4} \times \frac{2}{1}$

$= \frac{6}{4}$

$= \frac{3}{2}$

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

$\times (-2) \quad \times (-2)$

$x = -14$

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

$\times 3 \quad \times 3$

$\frac{-a}{-1} \quad \frac{9}{-1}$

$a = -9$

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

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?
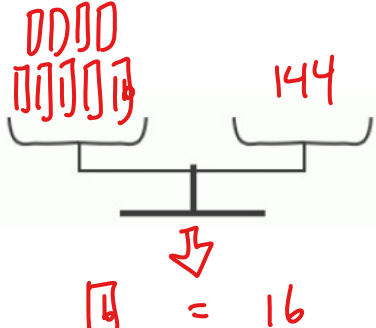
t	v
12	24
6	12
7	14
⋮	⋮

$t \quad 2t$

$$v = 2t$$

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

LET b BE THE NUMBER OF BEADS

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

$$b = 16$$

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

Solve:

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

$$\boxed{x = -7}$$

Check: x →

$$6x = -42$$

$$6(-7) = -42$$

$$-42 = -42 ✓$$