6.0 INTRODUCTION TO LINEAR EQUATIONS

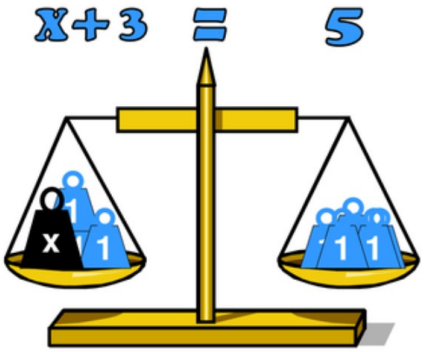
Name:_____ Block_____

A) BALANCING EQUATIONS

What does it mean to ***solve an equation?***

In algebra, an e_____ sign is considered a b_____ sign.

It tells us that the expression on either side of the equal sign represents the same number.

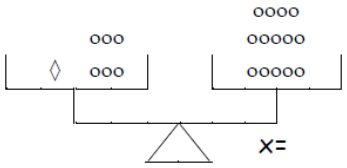


Replacing the variable in the equation $x + 3 = 5$ with a constant that makes the equation true is said to be a _____ to the equation.

Write an equation and use algebra stones to solve the equation.

Let ◊= x, ♦=-x, o=1 and •=-1

38. =



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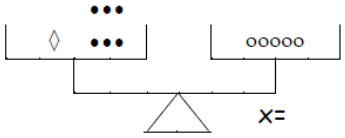

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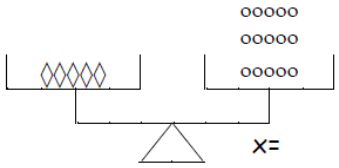

When solving an equation, you want to isolate the variable on one side of the equation. This can be done by applying ***inverse operations***.

Inverse operations undo one another.

Warm Up #1: Write the ***inverse*** of each scenario.

a) Put your socks on, then your shoes.	b) Put the key in the engine and turn the car on.
c) Multiply a number by two then add one.	d) Subtract 3 then divide by 5.

*** List the inverse operations**:

_____ & _____

_____ & _____

We apply these inverse operations when we solve equations.

Definition: Inverse Operations

29. The inverse of adding 5 is _____5.
30. The inverse of subtracting 7 is _____7.
31. The inverse of multiplying by 2 is _____by 2.
32. The inverse of dividing by 2 is _____by 2.

33. Additive inverses, $(+,-)$, add to [ ] and multiplicative inverses, $(\times,\div)$, multiply to, [ ].

Perform the inverse operation to isolate x.

34. $x+5=10$	35. $x-7=10$	36. $2x=10$	37. $\frac{x}{3}=10$

B) ONE-STEP EQUATIONS

These types of algebraic equations require you to do one operation (on both sides) in order to isolate the variable "x"

Example #1: Solve each equation

	Solution	Check your Work!
a.	$x + 7 = 21$	$x + 7 = 21$
b.	$x - 3.1 = -7.9$	$x - 3.1 = -7.9$
c.	$3x = 27$	$3x = 27$
d.	$-4x = -24$	$-4x = -24$
e.	$\frac{x}{5} = 6$	$\frac{x}{5} = 6$
f.	$-\frac{1}{3}x = 6$	$-\frac{1}{3}x = 6$

PRACTICE

What specific operation must be performed to isolate x?

41. $x + 3 = 14$	42. $x - 6 = 10$	43. $3x = 15$	44. $\frac{x}{4} = 20$
45. $-5x = 30$	46. $7 + x = 16$	47. $\frac{x}{-3} = -9$	48. $-18 = -3x$

ONE-STEP EQUATION SUMMARY

We have found that to solve equations of the form

$$x + a = b \qquad x - a = b$$

we subtract (or add) a to both sides of the equation.

We have found that to solve an equation of the form

$$ax = b$$

we divide both sides of the equation by a.

We have found that to solve equations of the form

$$\frac{a}{b}x = c \qquad \frac{ax}{b} = c$$

we multiply both sides by b, then divide both sides of the equation by a.

Homework

Complete the following questions to SOLVE FOR X.

TRY the challenge questions…I bet you'll surprise yourself!

2. Determine the solution of each equation.

a) $x + 3 = 7$

b) $x - 3 = 7$

c) $x + 3 = -7$

d) $x - 3 = -7$

e) $-x + 3 = 7$

f) $-x - 3 = 7$

a) $\frac{x}{6} = 2$

b) $\frac{6}{x} = 2$

c) $\frac{x}{6} = -2$

d) $\frac{6}{x} = -2$

e) $\frac{x}{10} = 5$

f) $\frac{10}{x} = 5$

g) $3x + 2 = 2x - 3$

h) $-3x + 2 = -2x - 3$

i) $3x - 2 = 2x - 3$

j) $-3x - 2 = -2x - 3$

3. Determine the solution of each equation.

a) $\frac{2}{3}x = 12$

b) $\frac{2}{3}x = -12$

c) $-\frac{2}{3}x = 12$

d) $-\frac{2}{3}x = -12$

e) $\frac{4}{5}x + 3 = 11$

f) $\frac{4}{5}x - 3 = 9$

g) $-\frac{4}{5}x + 5 = -7$

h) $-\frac{4}{5}x - 7 = -3$

i) $\frac{3}{4}x - 6 + 12 = 0$

j) $-\frac{3}{4}x - 6 + 12 = 0$