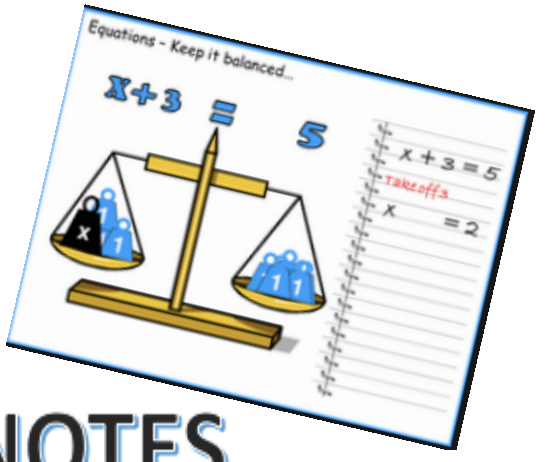
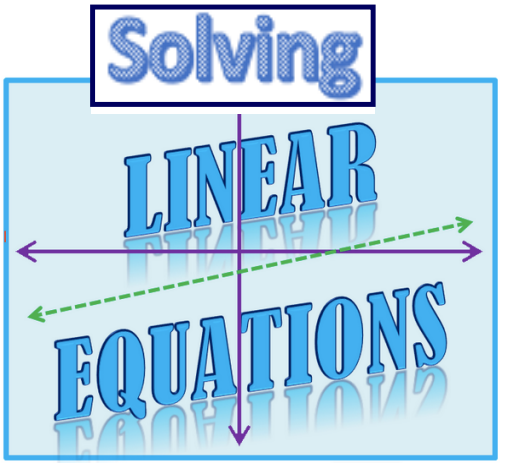
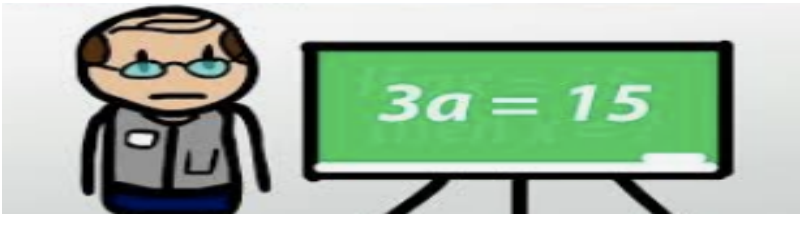


SEMINAR NOTES

Learning Guide 11





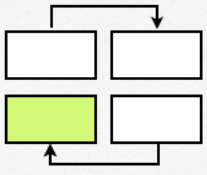
Inverse Operations

Solving equations involves undoing steps by using the inverse operation.

- First build the equation moving to the right.
- Working to the left, use the inverse (or opposite) operation to solve the equation.

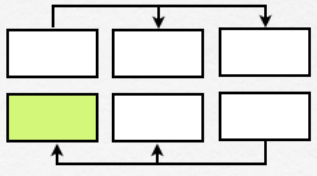
Ex. 1 Solve the following equation. $2x = 10$

Build equation



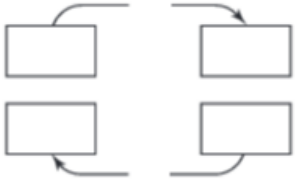
Ex. 2 $3x + 5 = 14$

Build equation

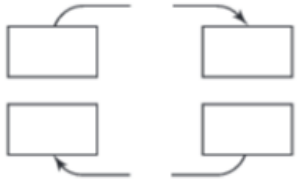


Practice:

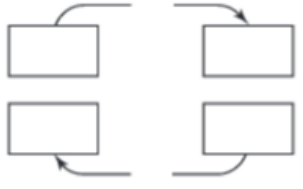
1. $5x = 20$



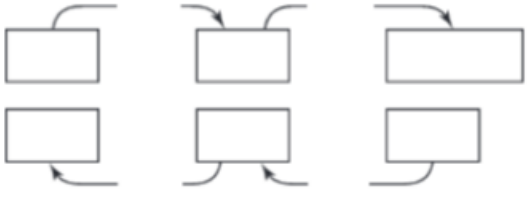
2. $-2x = 16.8$



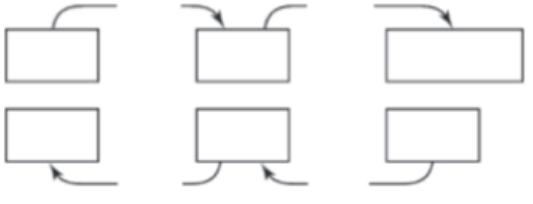
3. $\frac{x}{7} = -2$



4. $5x + 1 = -14$



5. $\frac{x}{2} - 5 = 1$



Solving Basic Equations

To move numbers across the equal sign use the opposite operation.

- Identify the number you want to move.
- Decide on the opposite operation (+/–, x/÷).
- Perform that operation to both sides with that number.

Ex. Solve the following equation.

$x + 5 = 11$

Ex. Solve the following equation.

$x - 5 = 11$

Practice:

$x + 2 = 8$ $\qquad$ $5 + m = 1$ $\qquad$ $d - 1 = 6$

Solving Basic Equations

To move numbers across the equal sign use the opposite operation.

- Identify the number you want to move.
- Decide on the opposite operation (+/–, x/÷).
- Perform that operation to both sides with that number.

Ex. Solve the following equation.

$2x = 12$

Ex. Solve the following equation.

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

Practice:

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

$-3x = 12$

Equations With Two Steps

Does it matter which number is moved first?

- To avoid fractions it is usually easier to work with addition or subtraction first.
- Move the number added (or subtracted) by doing the opposite operation.
- Move the number multiplied (or divided) by doing the opposite operation.

Ex. Solve the following equation.

$2x + 5 = 11$

Ex. Solve the following equation.

$\frac{x}{3} - 4 = -2$

Practice:

$5x - 1 = 14$

$\frac{x}{4} + 3 = 5$

Equations With Variables on Both Sides

Your goal is to solve the equation in the form x = #.

- Move variables to the same side.
- Move the constants to the opposite side.
- Divide out the coefficient.

Ex. Solve the following equation.

$6x - 2 = 3x - 7$

Practice:

$3x - 1 = x + 14$

$3 - 4x = 5 + 7x$

Equations With Parentheses

Multiply through the parentheses first.

- Multiply through the brackets.
- Move variables to the same side.
- Move the constants to the opposite side.
- Divide out the coefficient.

Ex. Solve the following equation.

$4(x-3) = 2(x+1)$

Practice:

$2(x-5) = -3(2x+1)$

$-2(3x-1) = 3(4x+1)$

Equations With Fractions

Can you cross multiply or do you need a LCD?

- If two terms then cross multiply, if more than two then multiply by a LCD.
- Move variables to the same side.
- Move the constants to the opposite side.
- Divide out the coefficient.

Ex. Solve the following equation.

$$\frac{(3)}{2}=\frac{(x-3)}{3x}$$

Practice:

$$\frac{2x}{5}=\frac{-3}{4}$$

$$\frac{3}{4}=\frac{x-2}{5x}$$

Equations With Fractions

Can you cross multiply or do you need a LCD?

- If two terms then cross multiply, if more than two then multiply by a LCD.
- Move variables to the same side.
- Move the constants to the opposite side.
- Divide out the coefficient.

Ex. Solve the following equation.

$$\frac{2x}{3}+\frac{1}{2}=\frac{3}{4}$$

Practice:

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

$$\frac{5x}{6}+\frac{3}{4}=\frac{x}{6}+\frac{1}{4}$$

$$\frac{3x}{4}-2=\frac{x}{3}+1$$

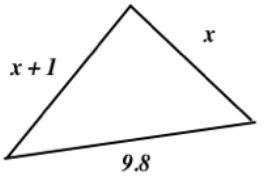
Equations With Shapes

Draw a picture?

- Write an equation.
- Solve

Ex. Solve the following:

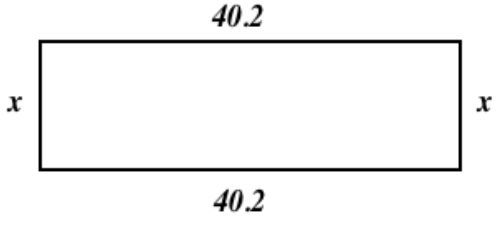
The perimeter of the triangle below is 40.2



a) Write an equation that can be used to determine x.
b) Solve the equation.

Practice:

The perimeter of the rectangle below is 100.6



a) Write an equation that can be used to determine x.
b) Solve the equation.