Equations

…. are mathematical sentences stating that two expressions are equivalent

How do you solve an equation?

Start with an equation

$2x + 4 = 10 - x$

Step 1 Variables need to be on the left side. Add x to both sides

$2x + 4 + x = 10 - x + x$

Whatever you do to one side you must do to the other too

Step 2 Combine "like" terms

$3x + 4 = 10$

Step 3 Numbers need to be on right side. Subtract 4 from both sides.

$3x + 4 - 4 = 10 - 4$

Step 4 Combine "like" terms

$3x = 6$

Step 5 Divide by the coefficient to get the value of 1x

$\frac{3x}{3} = \frac{6}{3}$

Step 6 There is your solution

$x = 2$

How do you know if you were correct?

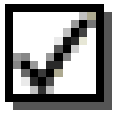
Equations can be checked quickly and easily by YOU.

In our example $2x + 4 = 10 - x$ our solution was x=2

Substitute the value you found for x back into the equation to see if the two sides are equal to each other. If they are equal then you were right ☺

If $x = 2$ $\quad 2(2) + 4 = 10 - 2$

$4 + 4 = 8$

$8 = 8$ 

Example 2

Solve the following equation

$7x - 6 = 22 + 3x$

Step 1 Variables need to be on the left side. Subtract 3x from both sides

$7x - 6 \quad -3x = 22 + 3x \quad -3x$

Whatever you do to one side you must do to the other too

Step 2 Combine "like" terms

$4x - 6 = 22$

Step 3 Numbers need to be on right side. Add 6 to both sides.

$4x - 6 \quad +6 = 22 \quad +6$

Step 4 Combine "like" terms

$4x = 28$

Step 5 Divide by the coefficient to get the value of 1x

$$\frac{4x}{4} = \frac{28}{4}$$

Step 6 There is your solution

$x = 7$

Example 3

Solve the following equation

$$-3x + 5 = 20 + 2x$$

Step 1 Variables need to be on the left side. Subtract 2x to both sides

$$-3x + 5 - 2x = 20 + 2x - 2x$$

Whatever you do to one side you must do to the other too

Step 2 Combine "like" terms

$$-5x + 5 = 20$$

Step 3 Numbers need to be on right side. Subtract 5 from both sides.

$$-5x + 5 - 5 = 20 - 5$$

Step 4 Combine "like" terms

$$-5x = 15$$

Step 5 Divide by the coefficient to get the value of 1x

$$\frac{-5x}{-5} = \frac{15}{-5}$$

Step 6 There is your solution

$$x = -3$$

Solving Equations That Look Like... Fractions !!!

Example #4 $\frac{3x}{4} = \frac{6}{2}$

Step 1 Cross multiply. $\frac{3x}{4} = \frac{6}{2}$

$6x = 24$

Step 2 Divide by coefficient $\frac{6x}{6} = \frac{24}{6}$

$x = 4$

Step 3 Check $\frac{3(4)}{4} = \frac{6}{2}$

$3 = 3$

Try it on your own!

Example #5 $\frac{9x}{10} = \frac{16}{6}$

Step 1 Cross multiply. $\frac{9x}{10} = \frac{16}{6}$

$54x = 160$

Step 2 Divide by coefficient $\frac{54x}{54} = \frac{160}{54}$

$x = 2.96$

Step 3 Check $\frac{9(2.96)}{10} = \frac{16}{6}$

$2.664 = 2.67$

Try it on your own!

Workbook:

P. 75 #1 & 2

Example #6 $\frac{(x+1)}{2} + \frac{(x-1)}{3} = -4$

Step 1 Find a common denominator for 2 and 3

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

$$\frac{6(x+1)}{2} + \frac{6(x-1)}{3} = 6(-4)$$

$$3(x+1) + 2(x-1) = -24$$

Step 2 Simplify

$$3x + 3 + 2x - 2 = -24$$

$$5x + 1 = -24$$

$$5x + 1 - 1 = -24 - 1$$

Step 3 Divide by coefficient

$$\frac{5x}{5} = \frac{-25}{5}$$

$$x = -5$$

Don't forget to check to see if you are correct