

**Unit 1B Day 16:  $\emptyset$  Solution and  $\infty$  Solution**

Focus Question: How do I tell when an equation has no solution or infinite solutions?

Solution (substitute & equation is true)

A. Infinite Solutions

Use the equation  $3 - 2x = 3x + 5 - 2 - 5x$

<sup>o/w</sup> 1. Is  $x = 6$  a solution?

$$3 - 2(6) = 3(6) + 5 - 2 - 5(6)$$

$$\text{Yes b/c } -9 = -9$$

<sup>ye</sup> 2. Is  $x = 0$  a solution?

$$3 - 2(0) = 3(0) + 5 - 2 - 5(0)$$

$$\text{Yes b/c } 3 = 3$$

<sup>pink</sup> 3. Is  $x = -2$  a solution?

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

$$\text{Yes b/c } 7 = 7$$

<sup>blue</sup> 4. Can you find another solution?  $x = 3$

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

$$\text{Yes } -3 = -3$$

1. Solve the equation to help you fill in the blanks:

An equation will have infinite  
(symbol:  $\infty$ ) solutions when the  
two binomial expressions  
have the same coefficients AND  
the same constants.

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

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

$$+2x \quad +2x$$

$$3 = 3$$

the x is gone!  
 $3 = 3$  is true

const.    coeff    coeff    const.

2. Do the following equations have  $\infty$  solutions? Explain.

a.  $3x + 6 = 3x + 6$  will have  $\infty$  solutions because the coeff & const. are the same.

b.  $\frac{1}{4}x - 2 = \frac{1}{4}x + 6$  will not have  $\infty$  solutions because even though coeff. are =, the const. are diff.

c.  $2x - 4 = 7x + 2$  will not have  $\infty$  solutions because coeff & const. are different.

d.  $\frac{1}{3}x - 4 = -4 + \frac{1}{3}x$  will have  $\infty$  solutions because the coeff & const. are the same.

B. No Solution

Use the equation  $6(x - 4) = -12 + 6x$

blue

1. Is  $x = 0$  a solution?

$$6(0-4) = -12 + 6(0)$$

$$-24 = -12$$

No b/c  $-24 \neq -12$

yel

2. Is  $x = 2$  a solution?

$$6(2-4) = -12 + 6(2)$$

$$-12 = 0$$

No b/c  $0 \neq -12$

oam

3. Is  $x = -4$  a solution?

$$6(-4-4) = -12 + 6(-4)$$

$$-48 = -36$$

No b/c  $-48 \neq -36$

pink

4. Guess at another solution and check it.  $x = 19$

$$6(19-4) = -12 + 6(19)$$

$$90 = 102$$

No b/c  $90 \neq 102$

5. Solve the equation to help you fill in the blanks:

An equation will have NO

(symbol:  $\emptyset$ ) solution when the

two expressions

have same coefficients AND

different constants.

$$6(x-4) \neq -12 + 6x$$

$$6(x) + 6(-4)$$

$$6x - 24 = -12 + 6x$$

$$-6x$$

$$-6x$$

$$-24 = -12 \quad \leftarrow \text{FALSE}$$

$$6x - 24 = -12 + 6x$$

↑  
coef.

↑   ↑  
const.

↑  
coef.

the x is gone!

6. Do the following equations have  $\emptyset$  solutions? Explain.

a.  $-\frac{5}{2}x - 7 = -\frac{5}{2}x$  \_\_\_\_\_ have  $\emptyset$  solutions because \_\_\_\_\_

$\emptyset$  Same coeff.  
diff. const.

b.  $\frac{1}{4}x - 2 = \frac{1}{4}x + 6$  \_\_\_\_\_ have  $\emptyset$  solutions because \_\_\_\_\_

$\emptyset$  Same coeff.  
diff.

c.  $2x - 4 = -4x + 2$  \_\_\_\_\_ have  $\emptyset$  solutions because \_\_\_\_\_

will have  
1 sol'n

d.  $\frac{1}{3}x - 4 = -4 + \frac{1}{3}x$  \_\_\_\_\_ have  $\emptyset$  solutions because \_\_\_\_\_

$\infty$  same coeff.  
same const.