

Warmup 11/ (Miss Niemiec's half-birthday)

1) Estimate: $\sqrt{35}$

≈ 5.9

$$\begin{array}{r} 5.9 \\ \times 5.9 \\ \hline 531 \\ 2960 \\ \hline 34.81 \end{array}$$

2) Is this a function? Why or why not?

x	2	4	6	8
y	8	14	20	22

Yes; every input has one output

3) Solve the equation:

$$2(4x - 5) = 9x - 10 - x$$

$$8x - 10 = 8x - 10$$

Any number would work!

Infinite Solutions

Turn in Scavenger Hunts

- p. 1 Converting Fractions and Decimals (1.1)
- p. 2 Roots (1.8 & 1.9)
- p. 3 Solving x^2 and x^3 Equations (1.8)
- p. 4 Rational vs. Irrational (1.1)
- p. 5 What is a function?
- p. 6 Function Notation: $f(x)$
- p. 7 Linear vs. Nonlinear Functions
- p. 8 Constant Rate of Change
- p. 9 Slope with a Graph
- p. 10 Slope WITHOUT a graph
- p. 11 Slope-Intercept Form
- p. 12 Linear/Nonlinear Tables and Proportional Relationships
- p. 13 1 and 2 Step Equations
- p. 14 Equations w/ Variables on Both Sides
- p. 15 Equations w/ Distributive Property

p. 16 Equations with No Solution or Infinite Solutions

Equations with No Solution or Infinite Solutions ¹⁶

Objective:

-Solve equations that have no solution or infinite solutions

Equations with infinite solutions

- In the equation $2x = x + 3$, there is only one solution: 3, because 3 is the only number for x that would make both sides equal.
- Try to come up with an equation in which **every number** could work for x .

$$2x = 2x$$

$$3x - 4 = 3x - 2 - 2$$

$$x + 7 = x + 7$$

Equations with no solution

Can you think of an equation has **no** solutions? (No numbers could work for x?)

$$x + 1 = x + 2$$

$$0x = 7$$

$$2x + 10 = 2x + 3$$

What value of x makes the equation true?

$$x + 5 = x + 10$$

Nothing!

$$x + 10 = 10 + x$$

Any number!

$$x + x = 2x + 0$$

Any number!

$$2x = 3x$$

$x = 0$

$$x - 10 = x$$

Nothing!

$$2x + 6 = 2(x + 3)$$

Any number!

Examples

1. $4x + 3 = x + 18$

$$\begin{array}{r} \cancel{-x} \\ 3x + \cancel{3} = 18 \\ - \cancel{3} \end{array}$$

$$3x = 15$$

$$x = 5 \text{ one solution}$$

$$x = 5$$

2. $4x + 3 = 4x + 18$

$$\begin{array}{r} \cancel{-4x} \\ 3 = 18 \end{array}$$

No Solution

No solution

3. $6x + 10 = 2x + 10$

$$\begin{array}{r} \cancel{-2x} \\ 4x + \cancel{10} = 10 \\ - \cancel{10} \end{array}$$

$$4x = 0$$

$$x = 0 \text{ One Solution}$$

4. $3(x - 4) = x - 12 + 2x$

$$\begin{array}{r} \cancel{3x} - 12 = \cancel{3x} - 12 \\ - \cancel{12} \end{array}$$

$$-12 = -12$$

Infinite Solutions

Infinite Solutions

Important to realize:


- ***If the variables “go away” on BOTH SIDES of the equation, it will either have no solution or infinite solutions.

What value of x makes the equation true?

$$x + 5 = x + 10$$

No Solution:

- Something like: $2x + 5 = 2x + 6$


$$5 = 6$$

- Means it's an impossible equation – NO NUMBERS will work

What's the difference?

■ $\frac{0x}{0} = \frac{8}{0}$ vs. $\frac{8x}{8} = \frac{0}{8}$

Do you see why the one on the left
is impossible, but the one on the
right IS possible?

$$x = \frac{8}{0} = \text{error}$$

$$x = \frac{0}{8} = 0$$

Dividing by zero...

■ $\frac{0}{\text{anything}} = 0$ (so $x = 0$)

■ $\frac{\text{anything}}{0} = \text{undefined}$

(So no solution)

What value of x makes the equation true?

$$2x + 6 = 2(x + 3)$$

$$x + 10 = 10 + x$$

Infinite Solutions

- If you ever have the exact same thing on both sides
 - $5 = 5$
 - $2x - 8 = 2x - 8$
 - Etc.
- Means **EVERY NUMBER** will work

1 solution, zero solutions or infinite solutions?

1. $5(x - 3) + 10 = 2x + 3x - 5$

$$5x - 5 = 5x - 5 \quad \text{INFINITE}$$

2. $12 = 3(x + 5) - 3x$

$$12 = 3x + 15 - 3x$$

$$12 = 15$$

NO SOLUTION

3. $x + 3 + 3x + 5 = 2x - 4 + 12 + 2x$

$$4x + 8 = 4x + 8$$

INFINITE

4. $2(x + 3) = -2x + 6$

$$\begin{array}{r} 2x + 6 = -2x + 6 \\ +2x \quad \quad +2x \\ \hline 4x + 6 = 6 \end{array}$$

$$4x = 0 \rightarrow$$

$x = 0$
one solution

Realize the difference...

■ $4x = 5x$ vs. $4 = 5$

Left: x can equal zero
Right: no solution!

COMMON MISTAKE

- What is going to happen here?

$$5x + 9 = 5x$$

- If you get rid of the variables on BOTH SIDES, it is either going to be “No solution” or “Infinite solutions”.
- Don't just leave it as “ $9 = 0$ ”. You MUST write infinite solutions or no solution.

ONCE AGAIN...

IMPORTANT

- **" $7 = 8$ " is NOT AN ANSWER.**
- **You MUST write "No solution"**

Homework: “Special” Equations Worksheet