

LEARNING OBJECTIVE: We will understand and write solution sets for equations and inequalities. (Lesson 85)

ACTIVATING PRIOR KNOWLEDGE:

- A **number sentence** is a statement of equality between two numerical expressions.
- An **algebraic equation** is a statement of equality between two expressions.

Which are algebraic equations and which are number sentences? Of the number sentences, which are true and which are false?

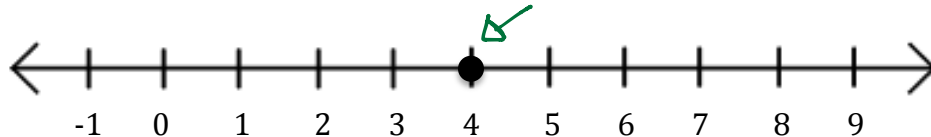
$\frac{1}{3} + \frac{2}{3} = \frac{3}{6}$	Number sentence, Not true
$3.1x + 11.2 = -2.5x + 2.3$	Not a number sentence
$\pi + \pi = 2\pi$	Number sentence, TRUE
$4^2 \times 3^2 = 12^2$	Number sentence, TRUE?!?. $4^2 \times 3^2 = (4 \times 3)^2 = 12^2$
$\sqrt{x+1} = \sqrt{x} + 1$	Not a number sentence

CONCEPT DEVELOPMENT:

A **solution set** of an equation written with one variable is the set of all values one can assign to that variable to make the equation a true statement. Any one of those values is said to be a solution to the equation.

Three different ways to represent solution sets for the example: $2x + 3 = 11$

- In Words:** $2x + 3 = 11$ has the solution of 4. That is, $2x + 3 = 11$ is true, when $x = 4$.
- In Set Notation:** The solution set of $2x + 3 = 11$ is $\{4\}$. ← Set notation
- In a graphical representation (number line):** The solution set for $2x + 3 = 11$ is



More on Set Notation:

$\{-3, 5, \sqrt{40}\}$ is the set containing -3 , 5 , and $\sqrt{40}$.

$\{x \text{ real} \mid x > 1\}$ is the set containing all real numbers such that $x > 1$.

$\{\}$ or \emptyset is the null set.

$$\{x \text{ integers} \mid x \geq 4\}$$

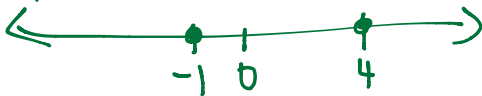
GUIDED PRACTICE:**Steps for Finding Solution Sets for Equations and Inequalities**

1. If necessary, "sift for possible solutions."
2. List the solution sets three ways: in words, in set notation, and graphically on a number line.

guess-and-check

$x^2 = 3x + 4$	
x	$x^2 = 3x + 4$
0	$0 \neq 4$
1	$1 \neq 7$
2	$4 \neq 10$
3	$9 \neq 13$
4	$16 = 16 \checkmark$
-1	$1 = 1 \checkmark$

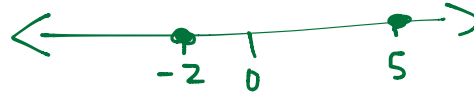
$x^2 = 3x + 4$ is true
when $x = 4$ or $x = -1$
 $\{4, -1\}$



$$x^2 - 3x = 10$$

$\{5, -2\}$

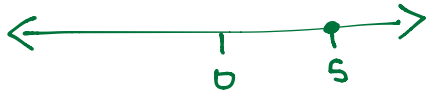
$x^2 - 3x = 10$ is true
when $x = 5$ or $x = -2$



$$12 - p = 7$$

$12 - p = 7$ is true
when $p = 5$

$\{5\}$



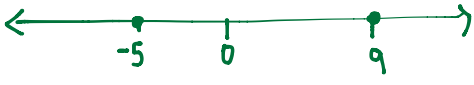
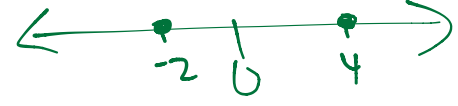
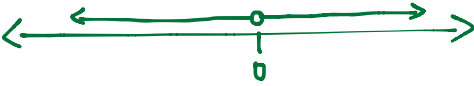
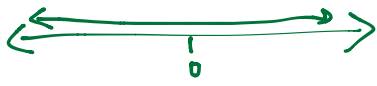
$$4w = 18$$

$\{4.5\}$

$4w = 18$ is true
when $w = 4.5$



answer

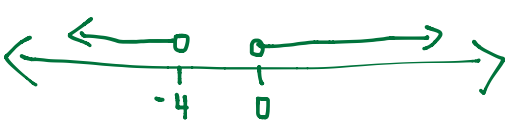
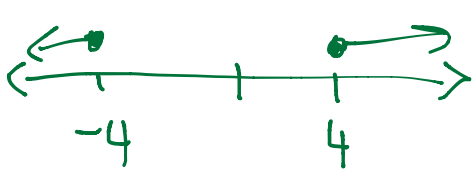
<p>2 ans.</p> <p>$\rightarrow (x-2)^2 = 49$</p> <p>$x-2 = 7$ $x = 9$</p> <p>$x-2 = -7$ $x = -5$</p> <p>$(x-2)^2 = 49$ is true when $x=9$ or $x=-5$</p> <p>$\{9, -5\}$</p> 	<p>$(x-1)^2 = 9$</p> <p>$(x-1)^2 = 9$ is true when $x=4$ or $x=-2$</p> <p>$\{4, -2\}$</p> 
<p>0 answers</p> <p>$(x-2)^2 = -49$</p> <p>Null set $\{\}$ Empty set \emptyset</p> <p>There are no real numbers that make $(x-2)^2 = -49$ a true sentence.</p>	<p>$(x-1)^2 = -9$</p> <p>\emptyset</p> <p>There are no real numbers that make $(x-1)^2 = -9$ true.</p>
<p>$\frac{x}{x} = 1$</p> <p>Any real number except 0 will make $\frac{x}{x} = 1$ true.</p> <p>$\{x \text{ real} x \neq 0\}$</p> 	<p>$2x + 4 = 2(x + 2)$</p> <p>Any real number makes the sentence true.</p> <p>$\{\mathbb{R}\}$</p> 

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$(y + 2)^2 > 4$ $y > 0 \quad \text{or} \quad y < -4$ $y + 2 > 2 \quad \text{or} \quad y + 2 < -2$ <div style="border: 1px solid green; padding: 5px; display: inline-block;"> $y > 0 \quad \text{or} \quad y < -4$ </div> 	$2x^2 \geq 32$ $x \geq 4 \quad \text{or} \quad x \leq -4$ 
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INDEPENDENT PRACTICE:

Create an expression for the right side of each equation such that the solution set for the equation will be all real numbers. (There is more than one possibility for each expression. Feel free to write several answers for each one).

$2x - 5 =$	$x^2 + x =$
$4 \cdot x \cdot y \cdot z =$	$(x + 2)^2 =$

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CLOSURE:

Give Exit Ticket for Lesson 11

NOTES:

This is lessons 10 and 11 from ENY Alg 1. Lesson 10 is in the APK only.

Homework should be ENY Problem Set from Lesson 11...could be independent practice too...