

SOL 6.18 – Equations

6.18 The student will solve one-step linear equations in one variable involving whole number coefficients and positive rational solutions.

Understanding the Standard:

- A one-step linear equation is an equation that requires one operation to solve.
- A mathematical expression contains a variable or a combination of variables, numbers, and/or operation symbols and represents a mathematical relationship. An expression cannot be solved.
- A term is a number, variable, product, or quotient in an expression of sums and/or differences. In $7x^2 + 5x - 3$, there are three terms, $7x^2$, $5x$, and 3.
- A coefficient is the numerical factor in a term. For example, in the term $3xy^2$, 3 is the coefficient; in the term z , 1 is the coefficient.
- Positive rational solutions are limited to whole numbers and positive fractions and decimals.
- An equation is a mathematical sentence stating that two expressions are equal.
- A variable is a symbol (placeholder) used to represent an unspecified member of a set.

SOL 6.18 – Solving One-Step Equations

Key concepts for Solving one-step equations...

- Do the inverse (opposite) of what is happening to the variable to both sides of the equal sign.

Adding and Subtracting

- You use the inverse property of addition and then the identity property of addition to solve for the variable.

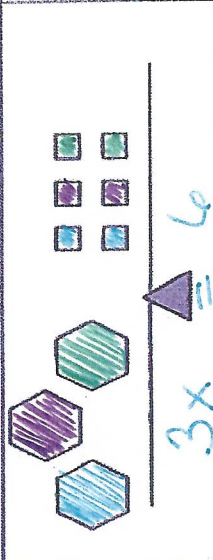
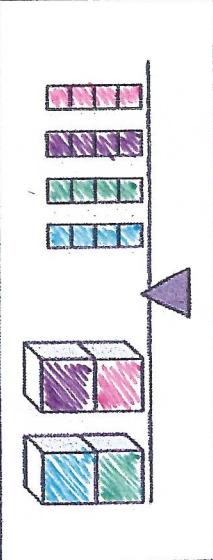
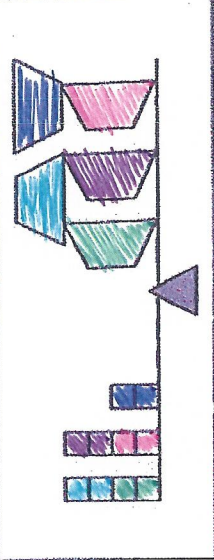
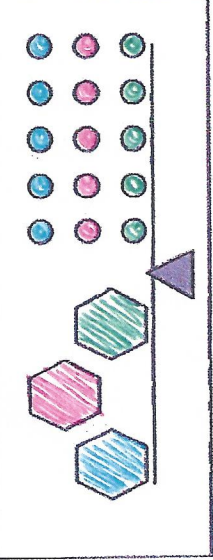
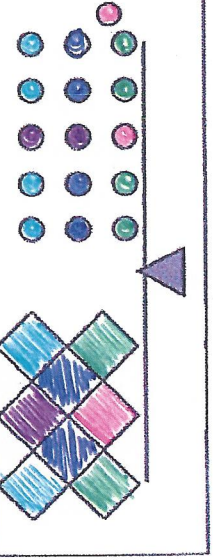
Multiplying and Dividing

- You use the inverse property of multiplication and then the identity property of multiplication to solve for the variable.

Do the inverse (opposite) of what is happening to the variable

	Picture	Equation	Find a Solution
$\text{Hexagon} = x$ $\text{Square} = 1$	<p>$x + 4 = 6$</p>	$x + 4 = 6$ Take away 4	$\begin{array}{r} x + 4 = 6 \\ -4 \quad -4 \\ \hline x = 2 \end{array}$
$\text{Cube} = x$ $\text{Square} = 1$	<p>$x + 3 = 7$</p>	$x + 3 = 7$ Take away 3	$\begin{array}{r} x + 3 = 7 \\ -3 \quad -3 \\ \hline x = 4 \end{array}$
$\text{Triangle} = x$ $\text{Square} = 1$	<p>$7 = 6 + x$</p>	$7 = 6 + x$ Take away 6	$\begin{array}{r} 7 = 6 + x \\ -6 \quad -6 \\ \hline 1 = x \end{array}$
$\text{Hexagon} = x$ $\text{Circle} = 1$	<p>$x + 7 = 12$</p>	$x + 7 = 12$ Take away 7	$\begin{array}{r} x + 7 = 12 \\ -7 \quad -7 \\ \hline x = 5 \end{array}$
$\text{Diamond} = x$ $\text{Circle} = 1$	<p>$x + 9 = 11$</p>	$x + 9 = 11$ Take away 9	$\begin{array}{r} x + 9 = 11 \\ -9 \quad -9 \\ \hline x = 2 \end{array}$

to both sides of the equation

Picture	Equation	Find a Solution
 <p>$3x = 6$</p>	$3x = 6$ Split into 3 groups	$\frac{3x}{3} = \frac{6}{3}$ $x = 2$
 <p>$4x = 16$</p>	$4x = 16$ Split into 4 groups	$\frac{4x}{4} = \frac{16}{4}$ $x = 4$
 <p>$10 = 5x$</p>	$10 = 5x$ Split into 5 groups	$\frac{10}{5} = \frac{5x}{5}$ $2 = x$
 <p>$3x = 15$</p>	$3x = 15$ Split into 3 groups	$\frac{3x}{3} = \frac{15}{3}$ $x = 5$
 <p>$8x = 16$</p>	$8x = 16$ Split into 8 groups	$\frac{8x}{8} = \frac{16}{8}$ $x = 2$

SOL 6.18 – Equation Vocabulary

Algebraic Expression → $x + 2$

$$2y - 3$$

$$6 - 8x$$

Equation → a statement that has 2 mathematical expressions **EQUAL**.

» Must have an **EQUAL** sign

$$x + 2 = 5$$

» **EQUA**tion = **EQUA**l

$$2y - 3 = 6 - 8x$$

Variable → a **quantity** that **varies**.

$$x + 2$$

(amount) (changes)

$$2y - 3$$

» **LETTERS**

$$6 - 8x$$

Coefficient → is the **numerical** factor in a term.

$$2x$$

(number)

$$6a - 3b$$

» In **front** of the variable.

$$9t$$

Term → A number, variable, product or quotient in an expression

$$x + 2$$

» Terms are **separated** by + or -.

$$2y - 3 + 4a$$

$$6 - 8x$$

$$\frac{1}{2} + 4$$

Name _____

Date _____

SOL 6.18 Algebraic Vocabulary

Directions: For every...

Equations – put a triangle around it \triangle Inequality – circle the inequality symbol \leq **Expression** – put a black box around it**Exponent** – shade orange purple**Coefficient** – shade red pink

Variable – shade green

Term – underline in blue

1.) $\boxed{2y - 3} \triangle \boxed{6 - 8x}$

2.) $\boxed{9a^2 + 2b - 3} > \boxed{4c + 8}$

3.) $\boxed{x^2 - 3z}$

4.) $\boxed{23 - \frac{4}{z}} \triangle \boxed{9n + c^3 - 9}$

5.) $\boxed{7k^2 + \frac{j}{3} + 18}$

6.) $\boxed{w^8 - m^2} \triangle \boxed{89s^3}$

7.) $\boxed{25e^2} \geq \boxed{19f^9 + 63g}$

8.) $\boxed{8u^3} \triangle \boxed{27n - 92x + \frac{p}{6}}$

9.) $\boxed{37d^3 - 15} > \boxed{\frac{3^2}{x}}$

10.) $\boxed{\frac{t}{7}} \triangle \boxed{42q - r^3 + 93s}$

Essential Understandings:

When solving an equation, why is it necessary to perform the same operation on both sides of an equal sign?

To keep the equation balanced or equal.

Essential Knowledge & Skills:

The student will use problem solving, mathematical communication, mathematical reasoning, connections and representation to

- Represent and solve a one-step equation, using a variety of concrete materials such as colored chips, algebra tiles, or weights on a balance scale.
- Solve a one-step equation by demonstrating the steps algebraically.
- Identify and use the following algebraic terms appropriately: *equation, variable, expression, term, and coefficient.*

Practice:

Solve each equation.

$$1. \quad 2x = 4.8$$
$$\frac{2x}{2} \Big| \frac{4.8}{2}$$
$$x = 2.4$$

$$4. \quad \frac{c}{6} = 0.6 \cdot 6$$
$$c = 3.6$$

$$2. \quad \frac{m}{2} = 4.8 \cdot 2$$
$$m = 9.6$$

$$5. \quad c - 6 = 0.6$$
$$+6 \Big| +6$$
$$c = 6.6$$

$$3. \quad c + 5\frac{5}{6} = 8\frac{1}{4}$$
$$-5\frac{5}{6} \Big| -5\frac{5}{6}$$
$$c = 2\frac{5}{12}$$

(Handwritten note: $8\frac{1}{4} = 8\frac{3}{12} = 7\frac{15}{12}$)

$$6. \quad x - 2\frac{4}{5} = 1\frac{7}{8} = 1\frac{35}{40}$$
$$+2\frac{4}{5} \Big| +2\frac{4}{5} \Big| +2\frac{32}{40}$$
$$x = 3\frac{67}{40}$$
$$3 + 1\frac{29}{40} = 4\frac{11}{20}$$