

# SLPS Continuous Learning

## May 11 – May 21

## Welcome!

You can print this packet directly from the site or pick up a packet from one of the lunch sites.

Students are encouraged to maintain contact with their home school and classroom teacher(s). If you have not already done so, please visit your child's school website to access individual teacher web pages for specific learning/assignment information. If you cannot reach your teacher and have elected to use these resources, please be mindful that some learning activities may require students to reply online, while others may require students to respond using paper and pencil. In the event online access is not available, please record responses on paper. Completed work should be dropped off at your child's school. Please contact your child's school for the dates and times to drop off your child's work.

If you need additional resources to support virtual learning, please visit: <u>https://www.slps.org/extendedresources</u>

If you have any questions or concerns please contact your child's teacher or myself (<u>zehra.khan@slps.org</u> or 314-532-3574)

Thank you and enjoy a great learning day!

Zehra Khan

Secondary Math Curriculum Specialist

#### Learning Standards/Objectives:

- 1) I can create equations and inequalities in one variable and use them to model and/or solve problems.
- 2) I can create and graph linear, quadratic and exponential equations in two variables.
- 3) I can solve literal equations and formulas for a specified variable that highlights a quantity of interest.
- 4) I can understand that a function from one set (domain) to another set (range) assigns to each element of the domain exactly one element of the range.
- 5) I can use function notation to evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
- 6) I can relate the domain and range of a function to its graph and, where applicable, to the quantitative relationship it describes.
- 7) I can represent constraints by equations or inequalities and by systems of equations or inequalities, and interpret the data points as a solution or non-solution in a modeling context.
- 8) I can solve a system of linear equations algebraically and/or graphically
- 9) I can solve problems involving a system of linear inequalities.

Algebra 150 Learning Plan							
Date	Торіс	Practice					
May 11, 2020	Review Solving Equations and Inequalities	Students should review reteach for understanding and solve the given problems  • Review 1					
May 12, 2020	Review Solving Equations and Inequalities	Students should watch the video(s) and complete practice questions <ul> <li><u>https://youtu.be/0671cRNjeKI</u></li> <li><u>Practice</u></li> </ul>					
May 13, 2020	Review Linear Equations	Students should watch the video(s) and complete practice questions <ul> <li><u>https://youtu.be/WkspBxrzuZo</u></li> <li><u>https://youtu.be/T-aCweuimis</u></li> <li><u>Practice</u></li> </ul>					
May 14, 2020	Review Linear Functions	Students should watch the video(s) and complete practice questions <ul> <li><u>https://youtu.be/Id6UovYjd-M</u></li> <li><u>https://youtu.be/WkspBxrzuZo</u></li> <li><u>Practice</u></li> </ul>					
May 15, 2020	Review Systems of Linear Equations and Inequalities	Students should watch the video(s) and complete practice questions         • <a href="https://youtu.be/5a6zpfl50go">https://youtu.be/5a6zpfl50go</a> • <a href="https://youtu.be/NPXTkj75-AM">https://youtu.be/NPXTkj75-AM</a> • <a href="https://youtu.be/GWZKz4F9hWM">https://youtu.be/GWZKz4F9hWM</a> • <a href="https://youtu.be/GWZKz4F9hWM">Practice</a>					

Algebra 150 Learning Plan						
Date	Date Topic Practice					
Week of May 18	Final Assessment	Students will complete the final assessment <ul> <li>Assessment</li> </ul>				

#### **Solving Linear Equations**

An equation is a mathematical sentence with an equal sign. If a sentence is true for a value of the variable in the equation, that value is called a *solution* of the equation. For x + 2 = 8, the solution is 6, because when 6 is substituted in the equation for x, the equation is true: 6 + 2 = 8.

**1.** Draw a line to match each lettered step for solving the equation x + 3(2x - 1) = 11 with a justification.

$$x + 3(2x - 1) = 11$$
a.  $x + 6x - 3 = 11$ 
b.  $7x - 3 = 11$ 
c.  $7x - 3 = 11 + 3$ 
d.  $\frac{7x}{7} = \frac{14}{7}$ 

$$x = 2$$
Division Property of Equality
Division Property of Equality

**2.** Describe and correct the error Cameron made when solving the equation 6x - 2(x - 5) = -2. Place an X next to the incorrect step and describe his error.



**3.** In the table below, show the solution of 7x - 10 + 4x = 34 by completing the missing expressions and equations in the steps.

Step	Reason		
7x - 10 + 4x = 34	Given equation		
= 34	Combine like terms.		
= 34 + 10	Addition Property of Equality		
	Simplify.		
	Division Property of Equality		
<u>x =</u>	Simplify.		

## 1-3 Reteach to Build Understanding

Solving Equations with a Variable on Both Sides

#### Each of these equations has a different type of solution.

6x - 12 = 3x - 12	6x - 12 = 6x - 12	6x - 18 = 6x - 12
6x + 3x = 12 - 12	6x - 6x = 12 - 12	6x - 6x = 18 - 12
<i>x</i> = 0	0 = 0	0 ≠ 6
One solution, $x = 0$ .	Infinitely many solutions.	No solution.
Only one value of x	Any value of x makes the	No value of <i>x</i> will make
makes the equation true.	equation true.	the equation true.

- 1. Simplify each equation so there is one expression on each side of the equation.
  - **a.** 2m = 8 6m 8m = 8
  - **b.** 3x = 9 + 9x \_\_\_\_\_
  - **c.**  $4 \cdot 3t = 12 2t$
  - **d.** 4y = 3(3y 4)

For each equation in Exercises 2–4, fill in the blank to form an identity.

**2.** -5x + 9 = 9 \_\_\_\_ **3.** \_\_\_ + 14*n* = 14*n* + 16 **4.** \_\_\_ - 18 = -5 - *k* - 13

#### For Exercises 5–7, fill in the blank to form an equation that has no solution.

**5.** \_\_\_\_ + 12 - 3d = 5d + 6 **6.** \_\_\_(m - 2) = -2(-2m + 6) **7.** \_\_\_\_ + 2y - 8 = 3(y - 11)

- **8.** Replace the answer you chose for Exercise 7 so that y = 5.
- **9.** Describe and correct the error Isabel made when solving 26(3 b) = -13(b 1). Place an X next to the incorrect statement and describe what was actually done.
  - **a.** Use the Distributive Property to get 78 26b = -13b + 13.
  - **b.** Subtract 13b from each side to get 78 13b = 13.
  - **c.** Subtract 78 from each side to get -13b = -65.
  - **d.** Divide each side by -13 to get b = 5.

## 1-4 Reteach to Build Understanding

Literal Equations and Formulas

- 1. For each literal equation, fill in the blanks to describe the steps you need to solve for the given variable.
  - **a.** Solve A = bh for b.

$$\frac{A}{h} = \frac{bh}{h}$$
$$b = \frac{A}{h}$$

To solve for *b*, divide each side of the equation by \_\_\_\_\_.

**b.** Solve P = 2l + 2w for *l*. P - 2w = 2l + 2w - 2w  $\frac{P - 2w}{2} = \frac{2l}{2}$  $\frac{P - 2w}{2} = l$ 

> To solve for *l*, first subtract \_\_\_\_\_\_ from each side of the equation and then divide each side by \_\_\_\_\_.

**2.** Place an X next to the error made when solving the literal equation ky + 3x = 8 for *y*. What is the correct solution?

$$ky + 3x = 8$$
$$ky + 3x - 3x = 8 - 3x$$
$$\frac{ky}{k} = \frac{8 - 3x}{k}$$
$$y = \frac{8}{k} - 3x$$

3. For each equation, complete the missing steps to solve for *x*.

a.	$\frac{XY}{6} = W$	b.	$y = \frac{1}{3} \left( x + w \right)$
	$\overline{xy = 6w}$	-	3y = x + w
		-	<i>x</i> =

## 1-5 Reteach to Build Understanding

Solving Inequalities in One Variable

Many of the same rules apply for solving an inequality as for solving an equality. The main difference is that when you multiply or divide each side of the inequality by a negative number the inequality sign is reversed.

**1.** Match each step on the left with its description on the right.

4t + 9	> 4	Simplify.
4 <i>t</i> + 9 – 9	> 4 - 9	Divide each side by 4.
4 <i>t</i>	> -5	Combine like terms and simplify.
$\frac{4t}{4}$	> <u>5</u> /4	Subtract 9 from each side.
t	> <u>5</u> /4	Original inequality

2. Benito has \$120 to go shopping. He spends \$30 on a pair of jeans. Benito also wants to buy some rings that cost \$18 each. He writes and solves an inequality to determine how many rings *r* he can buy. Describe and correct the error he made when solving the inequality.

$$\begin{array}{rcl}
 18r + 30 & \leq 120 \\
 18r + 30 - 30 & \geq 120 - 30 \\
 \frac{18r}{8} & \geq \frac{90}{18} \\
 r & \geq 5
 \end{array}$$

Benito can purchase 5 or more rings.

3. Complete the steps to solve each inequality. Then complete the sentences to describe the solutions.

a.	3(p - 2) - 7p	< 6	b.	2(3b + 7) – 6b	> 12
	3p - 6 - 7p	< 6		+ 10 - 6b	> 12
	-4 <i>p</i>	< 6	_		> 12
	-4 <i>p</i> - 6 + 6	< 6			
	-4 <i>p</i>	<	There are _ solutions to	this inequality.	
	q	3			
	The solution to inequality is	o this			

## 1 Performance Assessment Form A

Kelsey has designed a pendant, shown here, that hangs from a chain. She makes pendants by bending silver wire into circles. She plans to sell the pendants at a craft fair, and her goal is to make a minimum profit of \$50 at the fair.

**1.** Kelsey's pendant design connects one circle made from a wire 6 cm long to a second circle made from a wire 8 cm long.

#### Part A

The height of the pendant is determined by using the formula for the circumference of a circle,  $C = \pi d$ . Find the total height of the pendant design from top to bottom in terms of  $\pi$ . Then find the height rounded to the nearest tenth of a centimeter. Use 3.14 for  $\pi$ . Justify your answer.

#### Part B

Is the exact height of the pendant an irrational or a rational number? Justify your answer.

#### Part C

The cost of making a large circle is an amount in dollars and cents. The cost of making the smaller circle is  $\frac{3}{4}$  the cost of making the larger circle. Is the cost of making the smaller circle a rational or an irrational number? Justify your answer.

2. Kelsey has to pay \$200 to rent a booth at the craft fair. The materials for each pendant cost \$7.80, and she plans to sell each pendant for \$13.50. To make a profit, she must make more money than she spends. Kelsey has already made 10 pendants.

#### Part A

Given that Kelsey has already made 10 pendants, how many additional pendants must she make and sell in order to make a profit? Write and solve an inequality to answer that question. Show the steps of your solution.

#### Part B

Given that Kelsey has already made 10 pendants, how many additional pendants must she make and sell to make a profit of \$50? Justify your answer.

#### Part C

It takes Kelsey 5 hours to make 12 pendants. If she works 8 hours per day for 3 days before the craft fair, can she make enough additional pendants to sell so that she can make a profit of at least \$50? Explain.

## 2 Performance Assessment Form A

Suppose you are the diving officer on a submarine conducting diving operations. As you conduct your operations, you realize that you can relate the submarine's changes in depth over time to some linear equations. The submarine descends at different rates over different time intervals.

**1.** The depth of the submarine is 50 ft below sea level when it starts to descend at a rate of 10.5 ft/s. It dives at that rate for 5 s.

#### Part A

Draw a graph of the segment showing the depth of the submarine from 0 s to 5 s. Be sure the graph has the correct axes, labels, and scale. What constraints should you take into consideration when you make the graph?



#### Part B

You want to model the segment in Part A with a linear equation. Determine the slope and the *y*-intercept. Then write the equation in slope-intercept form for depth *y*, in feet, below sea level over time *x*, in seconds.

2. After the initial 5-second descent, the submarine increases its rate of descent to 20 ft/s for 5 s.

#### Part A

Sketch a second segment on the graph from Item 1 that represents a descent of 20 ft/s for 5 s.

#### Part B

What is the point-slope form of a linear equation that models the situation described in Item 2, Part A? Why does it make sense to use slope-intercept form for the equation you wrote in Item 1, and point-slope form for the equation in Item 2?

**3.** At the surface of the ocean, the water pressure on the submarine is the same as the air pressure above the water—about 15 lb/ in.<sup>2</sup>. Below the surface, the water pressure increases by about 9 lb/ in.<sup>2</sup> for every 20 ft of descent.

#### Part A

Write an equation in slope-intercept form showing the pressure p, in pounds per square inch, on the submarine at different depths d, in feet. Then graph the equation.



Depth (ft)

#### Part B

On another dive, the submarine descends at a steady rate from sea level. After 20 s the pressure gauge reads 100 lb/ in.<sup>2</sup>. What is the rate of descent for the submarine? Show the steps of your solution. If necessary, round answers to the nearest tenth.

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## 3 Performance Assessment Form A

Radio announcers must time their speeches so that commercials and news updates are the correct length. Do you know how fast you talk? How fast your friends talk? Students wrote tongue twisters like the ones below to use in an experiment. Each tongue twister is made up of a different number of words. For each tongue twister, the students timed how long each person in the experiment took to say it. Then they calculated the average time.

- Cheyenne shares pseudo sonar noise codes. (6 words)
- The sunshade sheltered Sawyer from the sunshine. (7 words)
- Parker picked a plenitude of perfect Paradise pears. (8 words)
  - **1.** The results of the students' experiment are shown in the table.

#### Part A

According to the data, is the relationship between the number of words *n* and the number of seconds it takes to say the tongue twister *t* a function? If so, describe the domain, its constraints, and the type of function (continuous or discrete) given by the domain.

Number of words	Average Time (s)
6	4.0
7	3.3
8	3.6
9	5.6
10	6.6
11	4.1
13	46

#### Part B

Make a scatter plot of the data in the table. Use technology to help you draw a line of best fit. What do you observe about the data?



2. From Item 1 Part B, describe the type of association the scatter plot shows. Is there a correlation between the number of words a tongue twister has and the time it takes to say the tongue twister? If so, do you think there is also a causal relationship? If not, what could influence the data? Explain.

**3.** A teacher decides to use text-to-speech software to read the tongue twisters and time the results. The results of the teacher's experiment are shown in the table.

#### Part A

From the two data sets in the table, is there a correlation between the number of words a tongue twister has and the time it takes to say the tongue twister? If so, do you think there is also a causal relationship? Explain.

Number of words	Average Time (s)
6	2.1
7	2.7
8	2.9
9	3.4
10	3.9
11	4.1
13	45

#### Part B

Using a graphing calculator, perform a linear regression to calculate the line of best fit for a scatter plot of the data. Write your function using the function notation from Item 1.

#### Part C

From Part B, what could the slope and the *y*-intercept of the line of best fit represent?

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## 4 Performance Assessment Form A

Paula is the student council member responsible for planning an outdoor student dinner dance. Plans include hiring a band and buying and serving dinner. She wants to keep the ticket price as low as possible to encourage student attendance while still covering the cost of the band and the food.

1. Band A charges \$600 to play for the evening. Band B charges \$350 plus \$1.25 per student.

#### Part A

Write a system of equations to represent the costs of the two bands.

#### Part B

Graph the system of equations and find the number of students for which the costs for both bands would be equal.

**2.** A caterer charges a fixed amount for preparing a dinner plus a rate per student served. The total cost is modeled by this equation:

total cost = fixed amount + rate · number of students

Paula knows that the total cost for 100 students will be \$750, and the total cost for 150 students will be \$1,050. Find the caterer's fixed cost and the rate per student served. Explain.

				X

**3.** Use the information you found in Items 1 and 2. Assume that 200 students attend the dance. Decide which band Paula should choose and what the cost per ticket should be so that the expenses for the dance are covered. Then repeat your calculations for 300 students. Explain.

**4.** Paula can spend no more than \$500 for a photographer to take specialty photos for the dinner. Aerial photos from a drone cost \$25 each, and wide-angle photos cost \$50 each.

#### Part A

Write and graph an inequality that represents the number of each type of photo that Paula can buy.

#### Part B

Suppose the photographer takes 11 aerial photos. What is the maximum number of wide-angle photos that Paula can afford? Explain.

y					
					X

### SLPS Algebra 150 Final Exam 2020

Completed exams should be submitted electronically to your teacher in the virtual classroom space or delivered to your school (If you have elected to complete the exam on paper). Please contact your Math teacher related to the exam contents, due dates and submission. **Before the Final Exam, please review the Academic Integrity Statement.** 



#### Missouri Learning Standards Assessed:

- A1.CED.A.1: Create equations and inequalities in one variable and use them to model and/or solve problems.
- A1.CED.A.2: Create and graph linear, quadratic and exponential equations in two variables.
- A1.CED.A.3: Represent constraints by equations or inequalities and by systems of equations or inequalities, and interpret the data points as a solution or non-solution in a modeling context.
- A1.CED.A.4: Solve literal equations and formulas for a specified variable that highlights a quantity of interest.
- A1.IF.A.1: Understand that a function from one set (domain) to another set (range) assigns to each element of the domain exactly one element of the range. a. Represent a function using function notation.
   b. Understand that the graph of a function labeled *f* is the set of all ordered pairs (*x*, *y*) that satisfy the equation *y*=f (*x*).
- A1.IF.A.2: Use function notation to evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
- A1.IF.B.4: Relate the domain and range of a function to its graph and, where applicable, to the quantitative relationship it describes.
- A1.REI.B.3: Solve a system of linear equations algebraically and/or graphically
- A1.REI.C.8: Solve problems involving a system of linear inequalities.

#### Academic Integrity Statement:

By signing or typing my name below, I certify this assessment was completed independently, without the use of outside help (including, but not limited to: web searches, peer assistance, adult help and copying)

Student Name (Type or Sign)

Today's Date (Type or Print)

Math Teacher Name (Type or Print)

School Name (Type or Print)

1. What is the value of *x* in this equation?

$$4(x+6) - 3x = 26$$

- A 20B 50
- 2 10

С

D

- Kendall bought 6 notebooks and 3 pens for a total of \$27. The cost of one notebook is \$1.50 more than the cost of one pen. What is the combined cost of one notebook and one pen?
- **3.** Solve the equation  $A = \frac{1}{2}bh$  for *h*.
- **4.** Graph the solution of the inequality on the number line.

2(x-3) - 5x < x - 2

-5 -4 -3 -2 -1 0 1 2 3 4 5

- 5. Solve the absolute value equation.
  - |x| 7 = -3
  - **A**  $x = \pm 4$
  - **B**  $x = \pm 10$
  - **C** x = 4, 10
  - **D** x = -4, -10

6. Graph the linear equation  $y = -\frac{2}{3}x + 4$ .



Which of the following is an equation of the line through (11, −3) and (7, 9)?

**A** 
$$y = -\frac{1}{3}x - \frac{20}{3}$$

**B** 
$$y = \frac{1}{3}x - \frac{20}{3}$$

**C** 
$$y = -3x + 30$$

**D** 
$$y = 3x - 12$$

- 8. What is an equation in standard form of the line that has *x*-intercept 1 and *y*-intercept 4?
  - $\mathbf{A} \quad x 4y = 4$
  - $\mathbf{B} \quad 4x y = 4$
  - **C** 4x + y = 4
  - $D \quad x 4y = -4$

- **9.** Write the equation in slopeintercept form of the line that passes through (12, 9) and is perpendicular to the graph of  $y = -\frac{3}{4}x + 1$ .
- **10.** Identify the domain and range of the function.



domain: \_\_\_\_\_

range: \_\_\_\_\_

**11.** A hardware store rents vacuum cleaners that customers may use for part or all of a day before returning. The store charges a flat fee plus an hourly rate. Write a linear function *f* for the total rental cost of a vacuum cleaner.

Hours	1	1.5	2	2.5	3
Cost (\$)	20	23	26	29	32

- **A** f(x) = 6x + 14
- $\mathbf{B} \quad f(x) = 3x + 14$
- **C** f(x) = 3x + 22
- $\mathbf{D} \quad f(x) = 6x + 24$
- **12.** In Item 11, how much is the flat fee that the store charges?

**13.** Which is a reasonable domain for the function in Item 11?

enVision Algebra 1

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- **A**  $14 < x \le 32$
- **B**  $0 < x \le 6$
- **C** 0 < *x* ≤ 12
- **D** 14 < *x* ≤ 86
- 14. In Item 11, what would be the cost to a customer to rent a vacuum for 7 hours?
- **15.** Given that g(x) = f(x) + k, identify a value of k that transforms f into g.



- **16.** Which of the following is an arithmetic sequence that could be modeled by an explicit formula expressed as a linear function?
  - **A** 0, 3, 8, 15, 24, 35, ...
  - **B** 9, 4, -1, -6, -11, -16, ...
  - **C** 1, 3, 6, 10, 15, 21, ...
  - **D** -1, 0, 1, 0, 3, 0

Na	ime							enVision Algebra 1
								PearsonRealize.com
17.	Each day, Amaya studies language flashcards and then reads some pages in a novel, as shown in the table. Make a scatter plot of the total time she studies as a function of the number of pages she reads. Draw a trend line.						20.	<ul> <li>Compute the residuals for the trend line from Items 17–19.</li> <li>x</li> <li>4</li> <li>6</li> <li>8</li> <li>10</li> <li>Residual</li> </ul>
	Pages Time (min)	4 27	6 32	8 39 10	10 45	12 51	21. 22.	<ul> <li>1. Which <i>r</i>-value suggests a weak positive correlation?</li> <li>A r = -0.23684</li> <li>B r = 0.23684</li> <li>C r = -0.97917</li> <li>D r = 0.97917</li> <li>2. The table shows the ages and weights of six kittens. Do the data show a <i>positive</i> or a <i>negative</i> correlation? Do the data show <i>causation</i> or <i>no causation</i>?</li> </ul>
18.	What type of	correl	lation	does	the	-		Age (weeks)         2         4         6         8           Weight (oz)         8         14         23         31
19.	A positive B negative C none D cannot te Which could trend line for	be an the da	equa equa	ition c	of a 17?	-	23.	3. Estimate the solution of the system of equations from the graph.
	<b>A</b> $y = 4x +$ <b>B</b> $y = 5x +$ <b>C</b> $y = 6x +$ <b>D</b> $y = 3x +$	12 12 10 14						solution:

3 of 4

Assessment Resources

12

10

42

- **24.** What is the solution of the system of equations?
  - $y = \frac{2}{3}x + 5$ 7x - 3y = 15 **A** (0, 5)
  - **B**  $(2, \frac{19}{3})$
  - **C**  $(4, \frac{23}{3})$
  - **D** (6, 9)
- **25.** What is the solution of the system of equations?

 $y = -\frac{7}{2}x + 11$ 7x + 2y = 20

- 26. Ten granola bars and twelve bottles of water cost \$23. Five granola bars and four bottles of water cost \$10. How much do one granola bar and one bottle of water cost?
- **27.** Graph the inequality  $y > \frac{2}{3}x 1$ .



- **28.** In the graph of an inequality, the region below a dashed horizontal line through the point (4, 1) is shaded. What inequality does the graph represent?
  - **A** *x* < 4
  - **B** *y* < 1
  - **C** y > 1
  - $\mathbf{D} \quad x > 4$
- 29. Graph the system of inequalities.

Х

 $2x - y \le 3$   $x - 2y \ge -2$   $4^{4y}$   $2^{4y}$   $-4^{4y}$   $-2^{2y}$   $-4^{2y}$   $-2^{2y}$   $-2^{2y}$   $-4^{2y}$ 

**30.** For a fundraiser, a group plans to sell granola bars and bottles of water at the same prices as described in Item 26. The group wants the income from the fundraiser to be at least \$150. Write an inequality to show the numbers of granola bars *x* and bottles of water *y* that the group needs to sell.