

ALGEBRA 1: Focus on Linear Functions

WRITING LINEAR EQUATIONS



lead4ward®

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TABLE OF STANDARDS

		Readiness Standards	Page
ARDS	(A.2) Linear functions, equations, and inequalities. The student applies the mathematical process standards when using properties of linear functions to write and represent in multiple ways, with and without technology, linear equations, inequalities, and systems of equations. The student is expected to:		
STAND	A.2C	write linear equations in two variables given a table of values, a graph, and a verbal description.	<u>12, 21,</u> <u>71</u>
ADINESS S	(A.3) Li process transfo inequal	inear functions, equations, and inequalities. The student applies the mathers standards when using graphs of linear functions, key features, and related rmations to represent in multiple ways and solve, with and without technology, ities, and systems of equations. The student is expected to:	ematical equations,
REA	A.3B	calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical and real-world problems.	<u>50, 53,</u> <u>71</u>

		Supporting Standards	Page
	(A.2) Lir process ways, wi student	near functions, equations, and inequalities. The student applies the mather standards when using properties of linear functions to write and represent in r th and without technology, linear equations, inequalities, and systems of equa- is expected to:	ematical nultiple tions. The
	A.2B write linear equations in two variables in various forms, including $y = mx$ + b, $Ax + By = C$, and $y - y_1 = m(x - x_1)$, given one point and the slope $5, 71$ and given two points.		
S	A.2E	write the equation of a line that contains a given point and is parallel to a given line.	<u>34</u> , <u>78</u>
IDARD	A.2F	write the equation of a line that contains a given point and is perpendicular to a given line.	<u>39</u> , <u>78</u>
STAN	A.2G write an equation of a line that is parallel or perpendicular to the X or Y axis and determine whether the slope of the line is zero or undefined.		<u>44, 78</u>
PPORTING	(A.3) Li i process transfor inequalit	near functions, equations, and inequalities. The student applies the mathe standards when using graphs of linear functions, key features, and related mations to represent in multiple ways and solve, with and without technology, ties, and systems of equations. The student is expected to:	ematical equations,
SU	A.3A	determine the slope of a line given a table of values, a graph, two points on the line, and an equation written in various forms, including $y = mx + b$, $Ax + By = C$, and $y - y_1 = m(x - x_1)$.	<u>47</u>
	(A.4) Lii process on real-	near functions, equations, and inequalities. The student applies the mather standards to formulate statistical relationships and evaluate their reasonablen world data. The student is expected to:	ematical ess based
	A.4C	write, with and without technology, linear functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems.	<u>66</u>

OVERVIEW

Algebra I: Focus on Linear Functions provides a variety of activites that address select standards bundled in the lead4ward Linear Functions TEKS Cluster. See below for descriptions of the three types of activities.

Skill Builders

Skill Builders address one Readiness or Supporting standards with an activity that builds understanding and fluency of the concept. Students learn a skill or underlying skill in bitesize pieces making these activities perfect for reteaching, tutoring, or intervention. Activities include guided learning and/or steps that lead students to successfully solving problems. Skill Builders are designed to be done with teacher-facilitated support or in small groups.

Testing Success Guides

Testing Success Guides address one Readiness Standard with 3-8 problems that represent a variety of ways that STAAR as assessed (or may assess) the SE. Students learn to read a problem, recognize what the problem is asking them to do, and answer the right question.

Students work through a Guided Analysis of the problems, seeing a variety of ways the content has been tested, examining both right and wrong answer choices. Testing Success Guides are designed to be done in small groups leaving the teacher time for small group support.

Note: Testing Success Guides represent a mix of multiple-choice items and interactive item types included on STAAR assessments. While not identical to interacting with these items electronically, the goal in this resource is to build on the thinking and reasoning skills necessary to be successful on STAAR assessments.

Concept Connectors

Concept Connectors address the concepts in 2-3 student expectations. Activities help students understand how concepts are related, reducing the cognitive load when concepts are mixed as on STAAR. Concept connectors are designed to be done in small groups with a facilitated discussion after the activity.

Each activity includes:

- Focus of the activity
- Setting Up for Instruction What needs to be copied and any simple supplies needed for the activity
- How-To Guide How to run the activity in your classroom, including, in some cases, suggestions for classroom conversations about the concepts
- Answer Key
- Students pages or recording sheets

A.2(B) Equations of Lines

SKILL BUILDER



Focus Change the form of equations including slope-intercept form, point-slope form, and standard form.

Setting Up For Instruction

□ Make 1 copy of A.2(B) Skill Builder (PG. 9–11) for each student.

How-To Guide

- 1. Place students in pairs and hand out materials.
- 2. Discuss the elements that make up the equation of a line using questions such as these:
 - \mathbb{Q} How are all three equations alike? All of them have x and y.
 - \mathbb{Q} What does the *m* stand for? *The slope*.
 - Q What does the *b* stand for? *The y-intercept*
 - \bigcirc What does the x_1 and y_1 stand for? They are coordinates of a point.
 - Q) What is the difference between x, y, x_1 , and y_1 ? x_1 and y_1 are a point on the line. x and y are variables.
 - Q How are b_1, x_1 , and y_1 alike? They represent points. The point that represents b is (0, b).
 - Q) When are A, B, and C used? Only in standard form
- 3. Work through the problems with students, changing equations of lines from one form to another. Focus on the information that is given in the original equation and the information that they need to write the equation in a different form.

A.2(B) Equations of Lines

Connect Forms of Equations of Lines

Being able to write equations of lines is a useful tool. Each form gives you information about the line. Equations of lines can be written in three ways:

y = mx + b	$y - y_1 = m(x - x_1)$	Ax + By = C
Slope-Intercept form	Point-Slope form	Standard form

You can use one form of the equation of a line to find an equation in another form.



ANSWER KEY (PG. 1 OF 3)

A.2(B) Equations of Lines

SKILL BUILDER

PROBLEM #2	y - 5 = 3(x - 4)
Which form is this equation written in?	$y = mx + b$ $(y - y_1 = m(x - x_1))$ $Ax + By = C$
Write the equation in Slope-Intercept for	orm.
Write the slope-intercept form of the equation	on of a line.
у	y = mx + b
To write the equation in the slope-intercept	form, you need two things, <u>m</u> and <u>b</u> .
The original equation includes the slope, m.	What is <i>m</i> ?3
The original equation does not include b, the	e y-intercept. How do you write the b as a point?
(0, <i>b</i>)	
To find b , substitute 0 for x and solve for y .	Find <i>b</i> .
y - 5 = 3(0)	0 - 4)
y - 5 = -12	2
<i>y</i> = -7	
Write the equation in slope-intercept form.	
y = 3x - 7	
Write the equation in Standard form.	
In Algebra 1, you can use equivalent equation	ons to find the standard form of the equation of a line.
What do you notice about the location of x a	and y in the standard form equation?
They are both on	one side of the equals sign.
Transform the original equation to standard each term in the equation by -1 to make A p	form. If the <i>A</i> (the first term) is negative, multiply positive.
<i>y</i> =	3 <i>x</i> – 7
-3x +	-y = -7
3x -	v = 7

A.2(B) Equations of Lines

SKILL BUILDER

ANSWER KEY (PG. 3 OF 3)

PROBLEM #3	5x - 6y = 3
Which form is this equation written in?	$y = mx + b$ $y - y_1 = m(x - x_1)$ $Ax + By = C$
Write the equation in Slope-Intercept for	orm.
Write the slope-intercept form of the equation	on of a line.
У	y = mx + b
Solve the original equation for y.	
5,	x - 6y = 3
-6	y = -5x + 3
y =	$=\frac{5}{6}x-\frac{1}{2}$
Write the equation in Point-Slope form.	
Write the point-slope form of the equation o	f a line.
y -)	$y_1 = m(x - x_1) \tag{1}$
To write the equation in the point-slope form	n, you need two things, <u>m</u> and (X_1, Y_1) .
Instead of using the standard form to chang	e to point-slope form, use slope-intercept form.
What information does slope-intercept form	give you? <u>m and b</u>
Substitute in the m and the b to find the equ	uation in point-slope form.
<i>Y</i> –	$y_1 = m(x - x_1)$
y –	$\frac{1}{2} = \frac{5}{6}(x-0)$
y –	$\frac{1}{2} = \frac{5}{6}x$
У	$=\frac{5}{6}x-\frac{1}{2}$

A.2(B) Equations of Lines

Connect Forms of Equations of Lines

Being able to write equations of lines is a useful tool. Each form gives you information about the line. Equations of lines can be written in three ways:

y = mx + b	$y - y_1 = m(x - x_1)$	Ax + By = C
Slope-Intercept form	Point-Slope form	Standard form

You can use one form of the equation of a line to find an equation in another form.

PROBLEM #1	y = 3x - 5	
Which form is this equation written in?	$y = mx + b$ $y - y_1 = m(x - x_1)$ $Ax + By = C$	
Write the equation in Point-Slope form.		
Write the point-slope form of the equation o	f a line.	
To write the equation in the point-slope form	n, you need two things,and	
The original equation includes the slope, m .	What is <i>m</i> ?	
The original equation also includes a point.	What is the point?	
Substitute in the m , the x_1 , and y_1 to write the equation of the line in point-slope form. Simplify if needed.		
Write the equation in Standard form.		
In Algebra 1, you can use equivalent equation	ons to find the standard form of the equation of a line.	
What do you notice about the location of x a	nd y in the standard form equation?	
Transform the original equation to standard equation by -1 to make A positive.	form. If the A is negative, multiply each term in the	

Name.

Name: ____

SKILL BUILDER (PG. 1 OF 3)

A.2(B) Equations of Lines

SKILL BUILDER

(PG. 2 OF 3)

PROBLEM #2	y-5=3(x-4)
Which form is this equation written in?	$y = mx + b$ $y - y_1 = m(x - x_1)$ $Ax + By = C$
Write the equation in Slope-Intercept for	orm.
Write the slope-intercept form of the equation	on of a line.
To write the equation in the slope-intercept	form, you need two things, and
The original equation includes the slope, <i>m</i> .	What is <i>m</i> ?
The original equation does not include b, the	b <i>y</i> -intercept. How do you write the <i>b</i> as a point?
To find <i>b</i> , substitute 0 for <i>x</i> and solve for <i>y</i> . I	Find <i>b</i> .
Write the equation in slope-intercept form.	
Write the equation in Standard form.	
In Algebra 1, you can use equivalent equation	ons to find the standard form of the equation of a line.
What do you notice about the location of x a	nd y in the standard form equation?
Transform the original equation to standard each term in the equation by -1 to make A p	form. If the <i>A</i> (the first term) is negative, multiply positive.

Name: _____

A.2(B) Equations of Lines

SKILL BUILDER

(PG. 3 OF 3)

PROBLEM #3	5x - 6y = 3
Which form is this equation written in?	$y = mx + b$ $y - y_1 = m(x - x_1)$ $Ax + By = C$
Write the equation in Slope-Intercept for	orm.
Write the slope-intercept form of the equation	on of a line.
Solve the original equation for <i>y</i> .	
Write the equation in Point-Slope form.	
Write the point-slope form of the equation o	f a line.
To write the equation in the point-slope form	n, you need two things, and
Instead of using the standard form to chang	e to point-slope form, use slope-intercept form.
What information does slope-intercept form	give you?
Substitute in the m and the b to find the equ	uation in point-slope form.

SKILL BUILDER

Focus Use a table and graph to write equations of lines in slope-intercept form, point-slope form, standard form, and using function notation.

Setting Up For Instruction

 $\hfill\square$ Decide which Practice you want students to do.

- □ **Practice #1** (PG. 17): Given a table, make a graph and write equations of lines.
- □ **Practice #2** (PG. 18): Given a table, make a graph and write equations of lines.
- □ **Practice #3** (PG. 19): Given a graph, make a table and write equations of lines.
- □ **Practice #4** (PG. 20): Given a graph, make a table and write equations of lines.
- □ Make 1 copy of the part(s) you chose of **A.2(C) Skill Builder** for each student.

How-To Guide

- 1. Place students in pairs and hand out materials.
- 2. Have students work together to make a table or graph and write equations of lines. Students may write the equations in any order they choose.
- 3. Facilitate a discussion about the order in which students chose to write the equations and why.

Connect Forms of Linear Equations with Tables and Graphs

PRACTICE #1: Start with a Table

x	У
-2	7
-1	5
2	-1
5	-7

Make a graph.



Slope-Intercept form	Point-Slope form
y = -2x + 3	Answers may vary. y - 5 = -2(x + 1)
Standard form	Function notation
2x + y = 3	f(x) = -2x + 3

Connect Forms of Linear Equations with Tables and Graphs

PRACTICE #2: Start with a Table

X	У
-4	-3
-1	$-\frac{9}{4}$
1	$-\frac{7}{4}$
8	0

Make a graph.



Slope-Intercept form	Point-Slope form
$y = \frac{1}{4}x - 2$	Answers may vary. $y + 3 = \frac{1}{4}(x + 4)$
Standard form	Function notation
x - 4y = 8	$f(x) = \frac{1}{4}x - 2$

Connect Forms of Linear Equations with Tables and Graphs

PRACTICE #3: Start with a Graph



Make a table.

x	У
-1	-8
0	-5
3	4
4	7

Slope-Intercept form	Point-Slope form
	Answers may vary.
y = 3x - 5	y + 8 = 3(x + 1)
Standard form	Function notation
3x - y = -5	f(x) = 3x - 5

SKILL BUILDER

ANSWER KEY (PG. 4 OF 4)

Connect Forms of Linear Equations with Tables and Graphs

PRACTICE #4: Start with a Graph



Make a table.

x	У
-9	<u>13</u> 2
-2	3
1	<u>3</u> 2
4	0

Slope-Intercept form	Point-Slope form
$y = -\frac{1}{2}x + 2$	Answers may vary. $y - 5 = -\frac{1}{2} (x + 1)$
Standard form	Function notation

SKILL BUILDER

(PG. 1 OF 4)

Connect Forms of Linear Equations with Tables and Graphs

PRACTICE #1: Start with a Table

x	У
-2	7
-1	5
2	-1
5	-7

Make a graph.



Slope-Intercept form	Point-Slope form
Standard form	Function notation

SKILL BUILDER

(PG. 2 OF 4)

Connect Forms of Linear Equations with Tables and Graphs

PRACTICE #2: Start with a Table

x	У
-4	-3
-1	$-\frac{9}{4}$
1	$-\frac{7}{4}$
8	0

Make a graph.



Slope-Intercept form	Point-Slope form
Standard form	Function notation

SKILL BUILDER

(PG. 3 OF 4)

Connect Forms of Linear Equations with Tables and Graphs

PRACTICE #3: Start with a Graph



Make a table.

x	У
-1	
0	
3	
4	

Slope-Intercept form	Point-Slope form
Standard form	Function notation

SKILL BUILDER

(PG. 4 OF 4)

Connect Forms of Linear Equations with Tables and Graphs

PRACTICE #4: Start with a Graph



Make a table.

x	У
-9	
-2	
1	
4	

Slope-Intercept form	Point-Slope form
Standard form	Function notation

TESTING SUCCESS GUIDE

Focus) Write equations from tables, graphs, and problem situations.

Setting Up For Instruction

- □ Make 1 single-sided copy of **A.2(C) Testing Success Guide Problems** [#1–2] (PG. 28).
- □ Make 1 single-sided copy of **A.2(C) Testing Success Guide Analysis** [#1–2] (PG. 29).
- □ Make 1 single-sided copy of **A.2(C) Testing Success Guide Problems** [#3–4] (PG. 30).
- □ Make 1 single-sided copy of **A.2(C) Testing Success Guide Analysis** [#3–4] (PG. 31).
- □ Make 1 single-sided copy of **A.2(C) Testing Success Guide Problems** [#5–6] (PG. 32).
- □ Make 1 single-sided copy of **A.2(C) Testing Success Guide Analysis** [#5–6] (PG. 33).

🖌 How-To Guide

- 1. Place students in pairs and hand out materials.
- 2. Have students place the **Problems** side by side with their **Analysis**.
- 3. Students work together to use the **Analysis** to understand and solve the **Problems**.

Back to the Table of **Contents** Table of **Standards**

A.2(C) Write Linear Equations

TESTING SUCCESS GUIDE PROBLEMS

ANSWER KEY (PG. 1 OF 6)



TESTING SUCCESS GUIDE ANALYSIS

Look at your Algebra 1 STAAR Mathematics Reference Materials. Find the Linear Equations section. Fill in the blanks. In the boxes, write in words what the constants stand for.



PROBLEMS #1 AND #2

1. What is the slope of the function for Problem #1? $-\frac{3}{2}$ Problem #2? <u>6</u>

2. Since the tables do not give you the *y*-intercept, it will be easier to use the point-slope form to find the equation. Complete the table.

Directions	Problem #1	Problem #1
Write the point-slope form of the equation.	$y - y_1 = m(x - x_1)$	$y - y_1 = m(x - x_1)$
Fill in the slope. Choose one of the points from the table and fill in the x_1 and the y_1 . When given a choice, always choose a point with 0 as one of the coordinates.	$y - 0 = -\frac{3}{2}(x - 1)$	y - 8 = 6(x - 1)
Since all of the answer choices have isolated y or f(n) on the left side of the equation, isolate the y or $f(n)$ on your equations.	$y = -\frac{3}{2}(x - 1)$	y = 6(x - 1) + 8
Use the distributive property to get rid of the parentheses. For Problem #2, change y to f(n). Mark that answer choice.	$y = -\frac{3}{2}x + \frac{3}{2}$	f(n) = 6n + 2
Now you have enough information to strike out two answer choices. Why is the last answer choice equivalent to the equation?	The division by 2 is factored out.	

A.2(C) Write Linear Equations



TESTING SUCCESS

GUIDE PROBLEMS

ANSWER KEY

(PG. 3 OF 6)

A.2(C) Write Linear Equations

TESTING SUCCESS GUIDE ANALYSIS

PROBLEM #3

- 3. What is the slope of the line? (Hint: Don't use the formula. Find the rise/run on the graph.) -3
- 4. What is the y-intercept? (Hint: Don't calculate it. Find it on the graph.) <u>-3</u>
- 5. What is the equation in slope-intercept form? Mark that answer choice. y = -3x + 3
- 6. Now that you know the equation in slope-intercept form, mark out another answer choice.
- 7. The last three answer choices resemble the point-slope form of the equation of the line. Choose one of the points on the grid and use it to fill in the point-slope form and mark that answer choice.

y = -3(x + 1) + 6

8. Choose the other point on the grid and use it to fill in the point-slope form. Mark that answer choice.

y = -3(x - 2) - 3

PROBLEM #4

- 9. Read the problem. Highlight the cost of the phone each month.
- 10. Highlight the part of the problem that tells you what *x* stands for and what *y* stands for. *x* stands for number of months paid *y* stands for unpaid cost
- 11. Analyze the y-intercept. How does 500 relate to the problem situation? the phone costs \$500
- 12. Analyze the *x*-intercept. How does 10 relate to the problem situation? It takes 10 months to pay for the phone.
- 13. Why does the line "go down" 50 each month?\$50 is paid on the phone price each month. Each month less is owed.
- 14. The answer choices are in the Slope-intercept form of the equation of a line.
- 15. What is the slope of the line? -50 What is the y-intercept of the line? 500
- 16. Circle the correct answer.

TESTING SUCCESS GUIDE PROBLEMS

5	A cell phone company is offering new cell phones for \$25 line fee per phone plus a service charge of \$10. Which linear function models the total cost for cell phone service, <i>c</i> , based on <i>p</i> , the number of phone lines? (A) $c = 25p + 10$ B) $c = 25p - 10$ (C) $p = 10c + 25$ (D) $p = 10c - 25$	
6	It's cookie season and chocolate mint cookies seem to be the only cookies selling this year! Each carton contains 12 boxes of cookies, and each person buys 2 boxes of cookies from a carton. Which function shows the relationship between $f(x)$, the total number of boxes of cookies left to sell, and x , the number of cartons of cookies. A $f(x) = 2x + 12$ B $f(x) = 2x - 12$ C $f(x) = 12x + 2$ D $f(x) = 12x - 2$	

TESTING SUCCESS GUIDE ANALYSIS

PROBLEM #5

- 17. How does the cell phone company figure out your cell phone bill? They multiply the number of cell phones by 25 and add 10.
- 18. When you write the equation of a line, you need to know the slope of the line and the *y*-intercept. Since this problem doesn't have a graph, you have to find the slope and the *y*-intercept in the problem itself. Which part of the problem tells the slope of the line? How do you know?
 \$25 line fee per phone; The line fee is multiplied by the number of phone lines, *c*.
- 19. Which part of the problem tells the y-intercept of the line? How do you know?\$10 service fee; It is paid every month, and the amount doesn't change.
- 20. Fill in the blanks using the numbers from the problem.

 $c = _{25} p + _{10}$

PROBLEM #6

- 21. Explain the problem situation in your own words. Answers will vary.
- 22. Draw a line through two of the answer choices that don't make sense. Which two answer choices don't make sense? Why?A and B; There are 12 boxes of cookies per carton, and we don't know the number of cartons. So x must be multiplied by 12.
- 23. Analyze the other answer choices. One of the answer choices uses addition and one uses subtraction. Which answer choices does not make sense? Why?C; When people buy 2 boxes of cookies, that is 2 boxes fewer that they have to sell.
- 24. Circle the correct answer.

TESTING SUCCESS GUIDE PROBLEMS

(PG. 1 OF 6)

	The table re	presents some points on t	he graph of	linear function g.	
		× -3	1 7	1	
				-	
		g(x) b	0 -9]	
	Which equa	tions represent this relation	nship?		
-	Choose THF	REE equations.			
.	$\Box y = -\frac{1}{2}$	$\frac{3}{2}(x+1)$			
	$\Box y = -$	$\frac{3}{2}x + \frac{3}{2}$			
	$\Box y = -$	$\frac{2}{3} (x - 1)$			
	$\Box y = -$	$\frac{3}{2}x + 1$			
	$\Box y = -$	$\frac{-3x+3}{2}$			
		2			
	The table sl feeder as a	nows the total amount of definition of the number of the second	eer corn disp cups it dispe	pensed from an autom enses at each feeding.	natic
					1
		Number of Cups Dispensed, <i>n</i>	Total Di	Number of Cups spensed, <i>f(n)</i>	
				0	
		1		8	
		1 3		20	
		1 3 7		8 20 44	-
		1 3 7 8		8 20 44 50	
2	Based on th	1 3 7 8 e table, which function mo	dels this situ	8 20 44 50 uation?	
2	Based on th	1 3 7 8 ie table, which function mo	dels this situ	8 20 44 50 Juation?	
2	Based on the A $f(n) = 8n$	1 3 7 8 ne table, which function mo	dels this situ	8 20 44 50 Juation?	
2	Based on the A $f(n) = 8n$ B $f(n) = \frac{1}{8}$	$\frac{1}{3}$ 7 8 1e table, which function mo	dels this situ	8 20 44 50 uation?	
2	Based on the A $f(n) = 8n$ B $f(n) = \frac{1}{8}$ C $f(n) = 6n$	$\frac{1}{3}$ 7 8 ne table, which function mo $-n - 2$ + 2	dels this situ	8 20 44 50 Juation?	
2	Based on the A $f(n) = 8n$ B $f(n) = \frac{1}{8}$ C $f(n) = 6n$ D $f(n) = \frac{1}{6}$	$\frac{1}{3}$ 7 8 ne table, which function mo $\frac{-n-2}{n+2}$ $n-2$	dels this situ	8 20 44 50 Juation?	
2	Based on the A $f(n) = 8n$ B $f(n) = \frac{1}{8}$ C $f(n) = 6n$ D $f(n) = \frac{1}{6}$	$\frac{1}{3}$ 7 8 ne table, which function mo $\frac{n}{2}$ $n - 2$ $n + 2$ $n - 2$	dels this situ	20 44 50 uation?	

Name: ____

TESTING SUCCESS GUIDE ANALYSIS

(PG. 2 OF 6)

Look at your Algebra 1 STAAR Mathematics Reference Materials. Find the Linear Equations section. Fill in the blanks. In the boxes, write in words what the constants stand for.



PROBLEMs #1 AND #2

- 1. What is the slope of the function for Problem #1? Problem #2?
- 2. Since the tables do not give you the *y*-intercept, it will be easier to use the point-slope form to find the equation. Complete the table.

Directions	Problem #1	Problem #1
Write the point-slope form of the equation.		
Fill in the slope. Choose one of the points from the table and fill in the x_1 and the y_1 . When given a choice, always choose a point with 0 as one of the coordinates.		
Since all of the answer choices have isolated y or f(n) on the left side of the equation, isolate the y or $f(n)$ on your equations.		
Use the distributive property to get rid of the parentheses. For Problem #2, change y to f(n). Mark that answer choice.		
Now you have enough information to strike out two answer choices. Why is the last answer choice equivalent to the equation?		

A.2(C) Write Linear Equations



Name: _

TESTING SUCCESS

GUIDE PROBLEMS

(PG. 3 OF 6)

Name: ____

TESTING SUCCESS GUIDE ANALYSIS

PROBLEM #3 3. What is the slope of the line? (Hint: Don't use the formula. Find the rise/run on the graph.) 4. What is the y-intercept? (Hint: Don't calculate it. Find it on the graph.) 5. What is the equation in slope-intercept form? Mark that answer choice. 6. Now that you know the equation in slope-intercept form, mark out another answer choice. 7. The last three answer choices resemble the point-slope form of the equation of the line. Choose one of the points on the grid and use it to fill in the point-slope form and mark that answer choice. 8. Choose the other point on the grid and use it to fill in the point-slope form. Mark that answer choice. PROBLEM #4 9. Read the problem. Highlight the cost of the phone each month. 10. Highlight the part of the problem that tells you what x stands for and what y stands for. x stands for _____ y stands for _____ 11. Analyze the y-intercept. How does 500 relate to the problem situation? 12. Analyze the x-intercept. How does 10 relate to the problem situation? 13. Why does the line "go down" 50 each month? 14. The answer choices are in the ______ form of the equation of a line. 15. What is the slope of the line? — What is the y-intercept of the line? — What is the y-intercept of the line? 16. Circle the correct answer.

TESTING SUCCESS GUIDE PROBLEMS

(PG. 5 OF 6)

5	A cell phone company is offering new cell phones for \$25 line fee per phone plus a service charge of \$10. Which linear function models the total cost for cell phone service, <i>c</i> , based on <i>p</i> , the number of phone lines? A $c = 25p + 10$ B $c = 25p - 10$ C $p = 10c + 25$ D $p = 10c - 25$
6	It's cookie season and chocolate mint cookies seem to be the only cookies selling this year! Each carton contains 12 boxes of cookies, and each person buys 2 boxes of cookies from a carton. Which function shows the relationship between $f(x)$, the total number of boxes of cookies left to sell, and x , the number of cartons of cookies. A $f(x) = 2x + 12$ B $f(x) = 2x - 12$ C $f(x) = 12x + 2$ D $f(x) = 12x - 2$

A.2(C) Write Linear Equations

PROBLEM #5

- 17. How does the cell phone company figure out your cell phone bill?
- 18. When you write the equation of a line, you need to know the slope of the line and the *y*-intercept. Since this problem doesn't have a graph, you have to find the slope and the *y*-intercept in the problem itself. Which part of the problem tells the slope of the line? How do you know?
- 19. Which part of the problem tells the *y*-intercept of the line? How do you know?
- 20. Fill in the blanks using the numbers from the problem.

c = ____*p* +____

PROBLEM #6

- 21. Explain the problem situation in your own words.
- 22. Draw a line through two of the answer choices that don't make sense. Which two answer choices don't make sense? Why?
- 23. Analyze the other answer choices. One of the answer choices uses addition and one uses subtraction. Which answer choices does not make sense? Why?

24. Circle the correct answer.

TESTING SUCCESS GUIDE ANALYSIS

(PG. 6 OF 6)

A.2(E) Parallel Lines

SKILL BUILDER



Find equations of parallel lines.

Setting Up For Instruction

□ Make 1 copy of the part(s) you chose of **A.2(E) Skill Builder** (PG. 37–38) for each student.

How-To Guide

- 1. Place students in pairs and hand out materials.
- 2. Work with students to complete PG. 37 (Problems #1–7).
- 3. Have students work together to complete the rest of the problems.
- 4. Then facilitate a discussion about the problems.

SKILL BUILDER

ANSWER KEY (PG. 1 OF 2)

A.2(E) Parallel Lines

Write Equations of Parallel Lines



V

A.2(E) Parallel Lines

SKILL BUILDER

8. Write the equation of the line in point-slope form that is parallel to the given line, *m*, and goes through point *P*.

Ρ m y - 5 = -2(x - 1)y - 5 = -2x + 2х y = -2x + 79. What is the equation in slope-intercept form of the line that passes through the point (1, 3) and is parallel to the line represented by $y = \frac{1}{4}x + 6$? $y-3=\frac{1}{4}(x-1)$ $y - 3 = \frac{1}{4}x - \frac{1}{4}$ $y = \frac{1}{4}x + \frac{11}{4}$ 10. Change the point-slope equation from Problem #9 to standard form. $y = \frac{1}{4}x + \frac{11}{4}$ 4y = x + 11-x + 4y = 11x - 4y = -11
SKILL BUILDER

A.2(E) Parallel Lines

Write Equations of Parallel Lines



Name: _____

WRITING LINEAR EQUATIONS

A.2(E) Parallel Lines

SKILL BUILDER

(PG. 2 OF 2)

8. Write the equation of the line in point-slope form that is parallel to the given line, *m*, and goes through point P. y Ρ m Х 9. What is the equation in slope-intercept form of the line that passes through the point (1, 3) and is parallel to the line represented by $y = \frac{1}{4}x + 6$? 10. Change the point-slope equation from Problem #9 to standard form.

A.2(F) Perpendicular Lines

SKILL BUILDER



) Find equations of perpendicular lines.

Setting Up For Instruction

□ Make 1 copy of the part(s) you chose of **A.2(F) Skill Builder** (PG. 42–43) for each student.

How-To Guide

- 1. Place students in pairs and hand out materials.
- 2. Work with students to complete PG. 42 (Problems #1–7).
- 3. Have students work together to complete the rest of the problems.
- 4. Then facilitate a discussion about the problems.

A.2(F) Perpendicular Lines

SKILL BUILDER

ANSWER KEY (PG. 1 OF 2)

Write Equations of Perpendicular Lines



y ▲

Ρ

A.2(F) Perpendicular Lines

goes through point P.

$y - 5 = \frac{1}{2} (x - 1)$ $y - 5 = \frac{1}{2} x - \frac{1}{2}$ $y = \frac{1}{2} x + \frac{9}{2}$
9. What is the equation in slope-intercept form of the line that passes through the point (1, 3) and is perpendicular to the line represented by $y = \frac{1}{4}x + 6$?
y - 3 = -4(x - 1) y - 3 = -4x + 4
y = 3 = -4x + 7 $y = -4x + 7$

8. Write the equation of the line in point-slope form that is perpendicular to the given line, *m*, and

10. Change the point-slope equation from Problem #9 to standard form.

$$y = -4x + 7$$
$$4x + y = 7$$

ANSWER KEY (PG. 2 OF 2)

(PG. 1 OF 2)

SKILL BUILDER

WRITING LINEAR EQUATIONS

A.2(F) Perpendicular Lines

Write Equations of Perpendicular Lines



A.2(F) Perpendicular Lines

Algebra 1 | Focus on Linear Functions

8. Write the equation of the line in point-slope form that is perpendicular to the given line, *m*, and goes through point P.



Name: ____

SKILL BUILDER

(PG. 2 OF 2)

A.2(G) Parallel and Perpendicular to Axes **SKILL BUILDER TEACHER PAGE**

Focus Match graphs of horizontal and perpendicular lines with true statements.

Setting Up For Instruction

□ Make 1 single-sided copy of **A.2(G) Skill Builder** (PG. 45–46) per pair.

How-To Guide

- 1. Place students in pairs and hand out materials. Have students cut apart the graphs and statements.
- 2. Have students separate the graphs from the statements and discuss the orientation of the lines to the axes.
- 3. Students match the graphs with the true statements.
- 4. Facilitate a class discussion about how students made the matches.

Answer Key	
<i>x</i> = 2	The line is parallel to the <i>y</i> -axis. The line is perpendicular to the x-axis. x = -5 is parallel to the line. y = -1 is perpendicular to the line. The slope is undefined.
<i>y</i> = 2	The line is parallel to the x-axis. The line is perpendicular to the y-axis. x = -5 is perpendicular to the line. y = -1 is parallel to the line. The slope is 0.
<i>x</i> = 4	The line is parallel to the <i>y</i> -axis. The line is perpendicular to the <i>x</i> -axis. x = -5 is parallel to the line. y = -1 is perpendicular to the line. The slope is undefined.
<i>y</i> = 4	The line is parallel to the x-axis. The line is perpendicular to the y-axis. x = -5 is perpendicular to the line. y = -1 is parallel to the line. The slope is 0.

Back to the Table of **Contents** Table of **Standards**

Name: _____

A.2(G) Parallel and Perpendicular to Axes

SKILL BUILDER

(PG. 1 OF 2)

Match True Statements to Graphs



A.2(G) Parallel and Perpendicular to Axes

SKILL BUILDER

(PG. 2 OF 2)

x = 2	x = 4
y = 2	y = 4
' The line is parallel to the <i>x</i> -axis. 	The line is parallel to the <i>x</i> -axis.
The line is parallel to the <i>y</i> -axis. 	The line is parallel to the <i>y</i> -axis.
 The line is perpendicular to the <i>x</i> -axis. 	The line is perpendicular to the <i>x</i> -axis.
' The line is perpendicular to the <i>y</i> -axis. 	The line is perpendicular to the y-axis.
x = -5 is perpendicular to the line.	x = -5 is perpendicular to the line.
x = -5 is parallel to the line.	x = -5 is parallel to the line.
y = -1 is perpendicular to the line.	y = -1 is perpendicular to the line.
y = -1 is parallel to the line.	y = -1 is parallel to the line.
' The slope is 0. 	The slope is 0.
The slope is undefined.	The slope is undefined.



A.3(A) Slope

SKILL BUILDER

TEACHER PAGE



Setting Up For Instruction

□ Make 1 copy of A.3(A) Skill Builder (PG. 49) for each pair.

□ Materials:

□ **Scissors**: 1 per student

How-To Guide

- 1. Place students in pairs and hand out materials. Have students cut apart the cards.
- 2. Have students find the slope cards.
- 3. Match the tables, graphs, points, and equations to the correct slopes.
- 4. Facilitate a discussion about how students found the slopes and which representation did they preferred to use to find the slope.

For an extra challenge, have students create the missing representations for each slope.

Back to the Table of **Contents** Table of **Standards**

A.3(A) Slope

SKILL BUILDER

ANSWER KEY

Slope = $\frac{3}{4}$	Slope = −3	Slope = 4	Slope = $\frac{4}{3}$
$y = \frac{3}{4}x - 3$	y = -3x + 1	$4x - y = -\frac{3}{4}$	$y + 3 = \frac{4}{3}(x - 2)$
(5, 6) and (1, 3)	x y 1 -2 3 -8 6 -17	x y 1 2 3 10 6 22	(3, 5) and (0, 1)

A.3(A) Slope

SKILL BUILDER



A.3(B) Rate of Change

SKILL BUILDER

TEACHER PAGE



Setting Up For Instruction

- □ Make 1 copy of **A.3(B) Skill Builder** (PG. 51–52) for each pair.
- □ Materials:
 - □ Highlighters: 1 per student

How-To Guide

- 1. Place students in pairs and hand out materials.
- 2. Work with students to:
 - Understand the information needed to calculate the rate of change.
 - Write the rate of change ratios.
 - Calculate the rate of change.

Answer Key

1.	change in <u>y</u> change in <u>x</u>	2
2.	change in <u>height</u> change in <u>floors</u>	7.5
3.	change in <u>\$ earned</u> change in <u>hours</u>	75
4.	change in <u>gallons</u> change in <u>miles</u>	14

Back to the Table of **Contents** Table of **Standards**

SKILL BUILDER

(PG. 1 OF 2)

Using Algebraic Language to Calculate the Rate of Change

Rate of change problems follow a specific format:



Once you know the quantities, you calculate the following to find the rate of change:

 $\frac{\text{change in } y}{\text{change in } x} \text{ or slope}$

In the situations below, underline the words "rate of change" and "with respect to". Highlight the quantities before and after the words "with respect to".		elow, underline change" and "with tities before and ith respect to".	Use words to fill in the blanks to write a fraction that represents the rate of change.	Write the rate of change.
 1. The values in the table represent a linear relationship between x and y. x 1 3 6 y 5 9 15 What is the rate of change of y with respect to x? 		the table represent ship between x 3 6 9 15 2 of change of yx ?	change in change in	
 What is the rate of change of height of a building with respect to the number of floors? Floors Height 0 5 2 20 4 35 6 50 		e of change of ling with respect of floors? Height 5 20 35 50	change in change in	

SKILL BUILDER

(PG. 2 OF 2)

3. A contractor earns \$50 for a house call plus \$75 per hour. What is the rate of change in the amount he earns with respect to the number of hours he works?		the to 5?	change in change in			
4. The amount of gas a truck uses is shown in the table.		es is				
	ſ	Miles	Gallons			
	Ĩ	3	42			
	ĺ	4	56		change in	
	[6	84		change in	
What is the rate of change of the amount of gas used with respect to the number of miles?						

TESTING SUCCESS GUIDE ANALYSIS

Focus) Write equations from tables, graphs, and problem situations.

Setting Up For Instruction

- □ Make 1 single-sided copy of **A.3(B) Testing Success Guide Problems** [#1–2] (PG. 60).
- □ Make 1 single-sided copy of **A.3(B) Testing Success Guide Analysis** [#1–2] (PG. 61).
- □ Make 1 single-sided copy of **A.3(B) Testing Success Guide Problems** [#3–4] (PG. 62).
- □ Make 1 single-sided copy of **A.3(B) Testing Success Guide Analysis** [#3–4] (PG. 63).
- □ Make 1 single-sided copy of **A.3(B) Testing Success Guide Problems** [#5–6] (PG. 64).
- □ Make 1 single-sided copy of **A.3(B) Testing Success Guide Analysis** [#5–6] (PG. 65).

How-To Guide

- 1. Place students in pairs and hand out materials.
- 2. Have students place the **Problems** side by side with their **Analysis**.
- 3. Students work together to use the **Analysis** to understand and solve the **Problems**.

TESTING SUCCESS GUIDE PROBLEMS



A.3(B) Rate of Change

TESTING SUCCESS GUIDE ANALYSIS

In rate of change problems, you are looking for a ratio between two quantities. The problem tells you what the quantities are.

- 1. On all the problems,
 - Underline the words "with respect to".
 - Highlight the quantities written before and after the words "with respect to". These are the two quantities that you'll use to make a ratio.

PROBLEM #1

2. Use the diagram to make a fraction with the quantities. The first quantity is the numerator and the second is the denominator. Simplify the fraction so that the denominator is 1.

In this problem, use the number of miles covered in a day, not the number of miles left to cover.



3. Fill in the answer.

PROBLEM #2

4. Use the diagram to make a fraction with the quantities. The first quantity is the numerator and the second is the denominator. Simplify the fraction so that the denominator is 1.



5. Circle the answer.

TESTING SUCCESS GUIDE PROBLEMS

	Number of Lawns Mowed, <i>x</i>	Total Amount of Money Earned,
-		15
	2	22.5
	5	37.5
Ľ	8	60
\$2.6 \$15. 1iki Suc	0 per yard 50 per yard .00 per yard do holds the women's world record fo le below shows the linear relationship	r speed-eating Nathan's Famous Hot i between the number of hot dogs Suc
, after	different amounts of time, <i>x</i> .	5
, after	different amounts of time, <i>x</i> . Hot Do	gs Eaten
, after	different amounts of time, <i>x</i> . Hot Do Minutes, <i>x</i>	gs Eaten Number of Hot Dogs Eaten, y
, after	different amounts of time, <i>x</i> . Hot Do Minutes, <i>x</i> 2	gs Eaten Number of Hot Dogs Eaten, y 9.7
, after	different amounts of time, <i>x</i> . Hot Do Minutes, <i>x</i> 2 5	gs Eaten Number of Hot Dogs Eaten, y 9.7 24.25
, after	different amounts of time, <i>x</i> . Hot Do Minutes, <i>x</i> 2 5 8 10	gs Eaten Number of Hot Dogs Eaten, y 9.7 24.25 38.8 48.5
after	different amounts of time, x. Hot Do Minutes, x 2 5 8 10 tatement describes the rate of chang to the number of minutes that Sudo hot dogs per minute	e of the n has eaten
ch s pect 4.85	different amounts of time, x. Hot Do Minutes, x 2 2 5 8 10 tatement describes the rate of chang to the number of minutes that Sudo hot dogs per minute not dogs per minute	S Eaten Number of Hot D 9.7 24.25 38.8 48.5 e of the number of hot has eaten hot dogs?

TESTING SUCCESS GUIDE ANALYSIS



TESTING SUCCESS GUIDE PROBLEMS

	The function $y = 100(h + 10)$ can be used to determine the cost in dollars for constructing a shed that takes h hours to build. What is the rate of change of the cost of the shed with respect to the number of hours?
	A \$10 per hour
	B \$1,000 per hour
5	C \$110 per hour
	D \$100 per hour
	The function $d = 90 + 40(s + 9)$ can be used to determine the cost in dollars, d , for catering for a party. What is the rate of change of the cost of catering with respect to the number of servers, s , needed for the party?
	A \$90 per server
	B \$40 per server
6	c \$9 per server
	D \$360 per server

A.3(B) Rate of Change

Г

TESTING SUCCESS GUIDE ANALYSIS

In Problems #5–6, the rate of change is the slope to slope-intercept form to find the slope.	of the equation. You need to change the equation				
PROBLEM #5 10. Follow the process to change the equation to slope	e-intercept form.				
Write the equation.	y = 100(h + 10)				
Distribute the 100. Circle the slope and mark the answer.	y = 1000 + 1000				
PROBLEM #6 11. Follow the process to change the equation to slope-intercept form.					
Write the equation.	d = 90 + 40(s + 9)				
Distribute the 40.	d = 90 + 40s + 360				
Combine the two constants. Circle the slope	d = 409 + 450				

and mark the answer.

A.3(B) Rate of Change

TESTING SUCCESS GUIDE PROBLEMS

Name: _



A.3(B) Rate of Change

Name: ____

TESTING SUCCESS GUIDE ANALYSIS

(PG. 2 OF 6)

In rate of change problems, you are looking for a ratio between two quantities. The problem tells you what the quantities are.

- 1. On all the problems,
 - Underline the words "with respect to".
 - Highlight the quantities written before and after the words "with respect to". These are the two quantities that you'll use to make a ratio.

PROBLEM #1

2. Use the diagram to make a fraction with the quantities. The first quantity is the numerator and the second is the denominator. Simplify the fraction so that the denominator is 1.

In this problem, use the number of miles covered in a day, not the number of miles left to cover.



3. Fill in the answer.

PROBLEM #2

4. Use the diagram to make a fraction with the quantities. The first quantity is the numerator and the second is the denominator. Simplify the fraction so that the denominator is 1.



5. Circle the answer.

TESTING SUCCESS GUIDE PROBLEMS

Name: _

Jeffrey mows lawns during the summer. The table below shows the linear relationship between the number of yards Jeffrey mows and the total amount of money he has earned mowing lawns.

Lawn	Mowing
------	--------

Number of Lawns Mowed, <i>x</i>	Total Amount of Money Earned, y
2	15
3	22.5
5	37.5
8	60

3

What is the rate of change of the amount Jeffrey earns with respect to the number of lawns he mows?

- A \$1.30 per yard
- **B** \$7.50 per yard
- **C** \$2.60 per yard
- **D** \$15.00 per yard

Miki Sudo holds the women's world record for speed-eating Nathan's Famous Hot Dogs. The table below shows the linear relationship between the number of hot dogs Sudo eats, y, after different amounts of time, x.

Hot Dogs Eaten

Minutes, x	Number of Hot Dogs Eaten, y
2	9.7
5	24.25
8	38.8
10	48.5

Which statement describes the rate of change of the number of hot dogs eaten with respect to the number of minutes that Sudo has eaten hot dogs?

- **A** 4.85 hot dogs per minute
- **B** 0.2 hot dogs per minute
- C 9.7 hot dogs per minute
- **D** 0.1 hot dogs per minute

TESTING SUCCESS GUIDE ANALYSIS



Name: _

TESTING SUCCESS GUIDE PROBLEMS

(PG. 5 OF 6)

5	The function y = 100(h + 10) can be used to determine the cost in dollars for constructing a shed that takes h hours to build. What is the rate of change of the cost of the shed with respect to the number of hours? A \$10 per hour B \$1,000 per hour C \$110 per hour D \$100 per hour
	The function $d = 90 + 40(s + 9)$ can be used to determine the cost in dollars, d , for catering for a party. What is the rate of change of the cost of catering with respect to the number of servers, s , needed for the party?
	A \$90 per server
	B \$40 per server
6	C \$9 per server
	D \$360 per server

Name: ____

TESTING SUCCESS GUIDE ANALYSIS

(PG. 6 OF 6)

In P to s	roblems #5–6, the rate of change is the slope of lope-intercept form to find the slope.	of the equation. You need to change the equation	I						
PRO	OBLEM #5								
10.	Follow the process to change the equation to slope	-intercept form.							
	Write the equation.								
	Distribute the 100. Circle the slope and mark the answer.								
PR(11.	DBLEM #6 Follow the process to change the equation to slope	-intercept form.							
	Write the equation.								
	Distribute the 40.								
	Combine the two constants. Circle the slope and mark the answer.								

SKILL BUILDER

Focus

Use Desmos to find the line of best fit and make predictions.

Setting Up For Instruction

A.4(C) Line of Best Fit

- □ Choose whether students will work on finding the line of best fit and/or using line of best fit to make predictions.
- □ Make 1 copy of the page(s) you choose for **A.3(A) Skill Builder** (PG. 69–70) for each student.

□ Materials:

Desmos, Texas Grade 8, EOC (Math) Version

Note: Be sure your students are using the *Texas Grade 8, EOC (Math) Version Desmos graphing calculator*, not the standard Desmos graphing calculator as certain features of the standard Desmos have been restricted from use on STAAR exam.

How-To Guide

1. Place students in pairs and hand out materials.

Find Line of Best Fit

- 2. Have students graph the table in Desmos.
 - Q) What do you notice about the points on the graph? They are linear but don't make a line.
 - \bigcirc A line of best fit is used when data is linear, but the data doesn't form an actual line.
 - Q) What do you need to write the equation of a line? Slope and y-intercept.
 - \bigcirc If you input the data into Desmos, it will give you the slope and *y*-intercept which can be used to write the equation of a line of best fit and make predictions.
- 3. Work with students to use Desmos to find the line of best fit.

Use Line of Best Fit to Make Predictions

- 4. Work through Problem #1 with students.
- 5. Have students work together to solve the rest of the problems.

Back to the Table of **Contents** Table of **Standards**

A.4(C) Line of Best Fit

SKILL BUILDER

Find Line of Best Fit

1. Graph the table.

x	-8	-5	-3	-2	1	2	4
У	-0.5	1.5	3.2	3.5	6	6.5	9

What do you need to know to write the equation of a line in slope-intercept form?

slope and y-intercept

2. In Desmos, type $y_1 \sim mx_1 + b$ in the second row. Fill in the blanks below.

	$y_1 \sim 1$	$mx_1 + b$		
	STATIS	STICS	RESIDUALS	
	$r^2 = 0.$	9888	e ₁ plot	
	<i>r</i> = 0.	.9944	·	
	PARAM	ETERS		
	<i>m</i> =	0.764189		
	b =	5.3723		
What does <i>m</i> stand for?	slope	What does	s <i>b</i> stand for?	y-intercept

3. Round the *m* and *b* to the tenths and fill in the blanks to write a line of best fit.

y = 0.8 x + 5.4

- In Desmos, enter the equation in the third row. What do you notice? The line goes through the "middle" of the points.
- 5. Find the line of best fit. Round the numbers to the tenths.

x	150	631	916	310	512	470	1,100
У	16	36	51	19	30	27	60



6. Find the line of best fit. Round the numbers to the tenths.

X	0	1	2	3	4	5	6	$v = -6.8 \times + 199.3$
У	200	194	185	176	172	165	160	y = <u>-0.0</u> x + <u>155.5</u>

SKILL BUILDER

ANSWER KEY (PG. 2 OF 2)

A.4(C) Line of Best Fit

Use Line of Best Fit to Make Predictions

1. Input the table into Desmos and find the line of best fit. Round the numbers to the tenths.

x	-8	-5	-3	-2	1	2	4
y	-0.5	1.5	3.2	3.5	6	6.5	9

y = <u>0.8</u> *x* + <u>5.4</u>

This equation can be used to predict the value of y when x is a number that isn't in the table. To find the value of y when x is 15,

- Type the equation of the line of best fit into Desmos.
- Replace the *x* with 15.

What is the value of *y* when *x* is 15? <u>13.0</u>

2. Use the table to predict the value of *y* when *x* is 1,500. Round the numbers to the tenths.

x	150	631	916	310	512	470	1,100
Y	16	36	51	19	30	27	60

y = 0 x + 5.7

When $x = 1,500, y = \frac{78.8}{1000}$

3. Use the table to predict the value of *y* when *x* is 10. Round the numbers to the tenths.

x	0	1	2	3	4	5	6
У	200	194	185	176	172	165	160

y = <u>-6.8</u> *x* + <u>199.3</u>

When
$$x = 10$$
, $y = 131.1$

0

200

X

V

1

194

WRITING LINEAR EQUATIONS

SKILL BUILDER

(PG. 1 OF 2)

Name: _____

A.4(C) Line of Best Fit

Find Line of Best Fit

1. Graph the table.

x	-8	-5	-3	-2	I	2	4
У	-0.5	1.5	3.2	3.5	6	6.5	9

What do you need to know to write the equation of a line in slope-intercept form?

_____ and _____

2. In Desmos, type $y_1 \sim mx_1 + b$ in the second row. Fill in the blanks below.

 $y_1 \sim mx_1 + b$

STATISTICS

 $r^2 = 0.9888$

r = 0.9944

PARAMETERS

 $\begin{array}{c|c} m = & & \\ b = & & \\ \end{array}$ What does *m* stand for? _____ What does *b* stand for? _____

3. Round the *m* and *b* to the tenths and fill in the blanks to write a line of best fit.

y =____*x* + ____

- 4. In Desmos, enter the equation in the third row. What do you notice?
- 5. Find the line of best fit. Round the numbers to the tenths.

6. Find the line of best fit. Round the numbers to the tenths.

2

185

3

176

4

172

5

165

6

160

X	150	631	916	310	512	470	1,100
Y	16	36	51	19	30	27	60



RESIDUALS

plot

e,

y = ____ x +____

A.4(C) Line of Best Fit

SKILL BUILDER

(PG. 2 OF 2)

Use Line of Best Fit to Make Predictions

1. Input the table into Desmos and find the line of best fit. Round the numbers to the tenths.

x	-8	-5	-3	-2	I	2	4
У	-0.5	1.5	3.2	3.5	6	6.5	9

y = _____*x* + _____

This equation can be used to predict the value of y when x is a number that isn't in the table. To find the value of y when x is 15,

- Type the equation of the line of best fit into Desmos.
- Replace the *x* with 15.
- 2. Use the table to predict the value of *y* when *x* is 1,500. Round the numbers to the tenths.

x	150	631	916	310	512	470	1,100
У	16	36	51	19	30	27	60

y = ____*x* + ____

When x = 1,500, y =_____

3. Use the table to predict the value of *y* when *x* is 10. Round the numbers to the tenths.

x	0	1	2	3	4	5	6
У	200	194	185	176	172	165	160

A.2(B), A.2(C), A.3(B) Equations of Lines

CONCEPT CONNECTOR

TEACHER PAGE

Focus Use problem situations to connect tables, graphs, rate of change, slope, *y*-intercept, equations of lines, and functions

Setting Up For Instruction

□ Make 1 copy of **A.2(B)**, **A.2(C)**, **A.3(B)** Concept Connector (PG. 75–77) for each student.

How-To Guide

- 1. Place students in pairs and hand out materials.
- 2. Have students work together to represent the situation using the following:
 - table
 - line
 - rate of change
 - slope
 - *y*-intercept
 - equations in slope-intercept form, point-slope form, and standard form
 - function notation

Students may use any order that makes sense to them.

3. Facilitate a discussion about the order students chose to represent each situation.

Back to the Table of Contents Table of Standards

Connect Problem Situations, Tables, Rate of Change, Slope, y-intercept, Graphs, and Equations

PROBLEM #1



Slope-Intercept formPoint-Slope form
$$y = 25x + 50$$
Answers may vary. $y - 100 = 25(x - 2)$ Standard formFunction notation $25x - y = -50$ $f(x) = 25x + 50$
CONCEPT CONNECTOR

ANSWER KEY (PG. 2 OF 3)

1ake a graph, find th	e rate of char	ige, the sl	e and y-intercep	ot, and writ	e equations	to
epresent this situati	on.					
		_	У			
x	У		32			
0	30]	30			
4	24] _	28			
6	21	lsel	26			
8	18	ber	24			
		Dis	22			
		<u>=</u> .	18			
		, sd n	16			
Rate of Change		of C	14			
1 ¹ / ₂ cups per	feeding	er	12			
Slana		a b	10			
3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3		NU	8			
- 2			6			
<i>y</i> -intercept			4			
, ,			2			

Slope-Intercept formPoint-Slope form
$$y = \frac{3}{2}x + 30$$
Answers may vary.
 $y - 24 = -\frac{3}{2}x - 24)$ Standard formFunction notation $3x + 2y = 60$ $f(x) = \frac{3}{2}x + 30$

PROBLEM #3

Make a table of values, find the rate of change, the slope and *y*-intercept, and write equations to represent this situation.

Max opened a savings account at the credit union. The graph below shows the relationship between the balance in dollars, *y*, and the number of months, *x*.

x	У
0	200
2	300
4	400
6	500





Slope-Intercept form	Point-Slope form							
y = 50x + 200	Answers may vary. y - 300 = 50(x - 2)							
Standard form	Function notation							
50x - y = -200	f(x) = 50x + 200							

CONCEPT AN CONNECTOR (P

ANSWER KEY (PG. 2 OF 3)

Connect Problem Situations, Tables, Rate of Change, Slope, y-intercept, Graphs, and Equations



Slope-Intercept form	Point-Slope form
Standard form	Function notation

CONNECTOR (PG. 2 OF 3)

ke a granh find	the rate of cha	ance the sl	one and v	-intercen	t and wr	ite equati	ons to
resent this situ	ation.	inge, the si		intercep			
							· ·
		-	<i>Y</i>				Т
x	У		32				_
0	30	7	30				-
4	24	1	28				-
6	21	Ser	26	\mathbb{N}^+			-
8	18	l ne	24	+			_
		, Disp	22		\mathbb{N}		-
		<u> </u>	20				-
		sd	18				-
Rate of Change		5 r	16				-
, , , , , , , , , , , , , , , , , , ,		of	17				
		pei	10				
Slope		E F	8				
		Z	6				
			4				

Slope-Intercept form	Point-Slope form
Standard form	Function notation

CONCEPT

Name: _

A.2(B), A.2(C), A.3(B) Equations of Lines

(PG. 3 OF 3)

PROBLEM #3

Max opened a savings account at the credit union. The graph below shows the relationship between the balance in dollars, *y*, and the number of months, *x*.

Make a table of values, find the rate of change, the slope and y-intercept, and write equations to represent this situation.



Slope-Intercept form	Point-Slope form
Standard form	Function notation

CONCEPT CONNECTOR

TEACHER PAGE



Find equations of parallel and perpendicular lines.

Setting Up For Instruction

□ Make 1 copy of A.2(E), A.2(F), A.2(G) Concept Connector (PG. 84–88) for each student.

How-To Guide

- 1. Place students in pairs and hand out materials.
- 2. Work with students to complete Problem #1 (PG. 84).
- 3. Have students work together to complete the rest of the activity.
- 4. Then facilitate a discussion about the problems.

Find Equations of Parallel and Perpendicular Lines



What is an equation in slope-intercept form that passes through $(-3, -2)$ and is parallel to the line in the graph?	What is an equation in slope-intercept form that passes through $(-3, -2)$ and is perpendicular to the line in the graph?
y = -2x - 8	$y = -\frac{1}{2}x - \frac{1}{2}$
Draw the line in the grid to prove that the lines are parallel.	Draw the line in the grid to prove that the lines are perpendicular.

A.2(E), A.2(F), A.2(G) Equations of Lines

CONCEPT CONNECTOR

ANSWER KEY (PG. 2 OF 5)



Write an equation in slope-intercept form that passes through 1 on the <i>y</i> -axis and is parallel to the line in the graph.	Write an equation in slope-intercept form that passes through 1 on the <i>y</i> -axis and is perpendicular to the line in the graph.
$y = \frac{1}{4}x + 1$	y = -4x + 1
Draw the line in the grid to prove that the lines are parallel.	Draw the line in the grid to prove that the lines are perpendicular.

CONCEPT CONNECTOR

ANSWER KEY (PG. 3 OF 5)



Write an equation in slope-intercept form that passes through the origin and is parallel to the line in the graph.	Write an equation in slope-intercept form that passes through the origin and is perpendicular to the line in the graph.
y = 3x	$y = -\frac{1}{3}x$
Draw the line in the grid to prove that the lines are parallel.	Draw the line in the grid to prove that the lines are perpendicular.

CONCEPT CONNECTOR

ANSWER KEY (PG. 4 OF 5)



Write an equation in slope-intercept form that passes through (5, 2) and is parallel to the line in the graph.	Write an equation in slope-intercept form that passes through (5, 2) and is perpendicular to the line in the graph.
$y = \frac{1}{2}x + \frac{9}{2}$	y = 2x - 8
Draw the line in the grid to prove that the lines are parallel.	Draw the line in the grid to prove that the lines are perpendicular.

A.2(E), A.2(F), A.2(G) Equations of Lines

ANSWER KEY (PG. 5 OF 5)

CONCEPT

CONNECTOR

PROBLEM #5

										8											-
										7											
										0 											
										-4									-		-
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										2											-
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	•	9 -1	8 -7	- 1	6-5	-4	-3	-2	-			1 :	2 :	3 -	. 5	6	7	1	3 9		× X
										-1											_
										-3											-
										-4											-
										-5											-
										-6											-
										-7											-
										-8											
										-9]
Write an equation that passes throug the line in the gra	in gh ph.	slo (4,	pe 7)	-in an	ter Id i	cep s p	ot f oara	orr alle	n el to	o	Write an equation in slope-intercept form that passes through (4, 7) and is perpendicular to the line in the graph.										
	y	=	7								<i>y</i> = 4										
Circle the slope of	th	e c	orig	ina	al li	ne.					Circle the slope of the perpendicular line.										
0		u	nd	lefi	ine	ed									0				\langle	un	defined
Circle the slope of the parallel line.																					
0		u	nd	lefi	ine	ed															
Draw the line in the grid to prove that the lines are parallel.							l	Dra line	aw es a	the are	e lii pe	ne erp	in end	the dic	e gi ula	rid r.	to prove that the				

У ,▲

nes CONNECTOR (PG. 1 OF 5)

CONCEPT

Find Equations of Parallel and Perpendicular Lines

PROBLEM #1

Wha	t is an equation in slope-intercept form	What is an equation in slope-intercept
that	passes through (-3, -2) and is parallel	form that passes through (-3, -2) and is
to t	he line in the graph?	perpendicular to the line in the graph?
Dra line	v the line in the grid to prove that the are parallel.	Draw the line in the grid to prove that the lines are perpendicular.

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A.2(E), A.2(F), A.2(G) Equations of Lines

(PG. 2 OF 5)

	У		
	8		
	7		
	6		
	5		
	3		
	2		
-9 -8 -7 -6 -	5 -4 -3 -2 -1	1 2 3 4 5 4 7	
	2		
	3		
	-4		
	-5		
	-6		
	-8		
	-9		

Write an equation in slope-intercept form that passes through 1 on the <i>y</i> -axis and is parallel to the line in the graph.	Write an equation in slope-intercept form that passes through 1 on the <i>y</i> -axis and is perpendicular to the line in the graph.
Draw the line in the grid to prove that the	Draw the line in the grid to prove that the
lines are parallel.	lines are perpendicular.



Algebra 1 | Focus on Linear Functions

A.2(E), A.2(F), A.2(G) Equations of Lines

Name: _____

CONCEPT

CONNECTOR

(PG. 3 OF 5)

PROBLEM #3

	-7 -6	-5	3 -2	2 -1	9 8 7 6 5 4 3 -1 -1 -2 -2 -2 -2 -2 -2 -2 -2 -2 -2		3	4	5	 7	 3 5	x
					-5-0 -6 -7 -8 -9	,						

y

Write an equation in slope-intercept form	Write an equation in slope-intercept form
that passes through the origin and is	that passes through the origin and is
parallel to the line in the graph.	perpendicular to the line in the graph.
Draw the line in the grid to prove that the lines are parallel.	Draw the line in the grid to prove that the lines are perpendicular.

A.2(E), A.2(F), A.2(G) Equations of Lines

CONCEPT

CONNECTOR (PG. 4 OF 5)

PROBLEM #4

	-9 -9	-8 -7	7 -6	-5 -		3 -2			2	3			6	7	8	9	→	ĸ	r				
Write an equation in slope-intercept form that passes through (5, 2) and is parallel to the line in the graph.							W fo pe	rite rm erp	e a i th end	n e at dic	equ pa: ula	atic sse r tc	on s t o tł	in : hrc ne	slo oug line	pe- jh (e in	-ir (5) n t	ite , 2 <u>]</u> he	rce) a gr	pt nd apf	is 1.		
Draw the line in the lines are parallel.	e gri	d to	pro	ove t	hat	the	е	D	raw	v tł	ne	line	e in	th	e g	grid	l to) t	oro	ve	tha	nt t	he

lines are perpendicular.

y

6

A.2(E), A.2(F), A.2(G) Equations of Lines

CONCEPT

CONNECTOR

PROBLEM #5

			3 -								
Write an equation i that passes throug the line in the grap	n slope-intercep h (4, 7) and is pa h.	t form arallel to	Write an equation in slope-intercept form that passes through (4, 7) and is perpendicular to the line in the graph.								
Circle the slope of	the original line.		Circle the slope of the perpendicular line.								
0	undefined		0 undefined								
Circle the slope of	the parallel line.										
0	undefined										
Draw the line in the lines are parallel.	e grid to prove th	hat the	Draw the line in the grid to prove that the lines are perpendicular.								

Y **,** Name: _____

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