UESSON Writing Linear **5.2** Equations from a Table

Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value... . Interpret the rate of change and initial value....

FL 8.F.2.4

ESSENTIAL QUESTION

How do you write an equation to model a linear relationship given a table?

Graphing from a Table to Write an Equation

You can use information from a table to draw a graph of a linear relationship and to write an equation for the graphed line.

Real EXAMPLE 1 Norla

The table shows the temperature of a fish tank during an experiment. Graph the data, and find the slope and y-intercept from the graph. Then write the equation for the graph in slope-intercept form.

Time (h)	0	1	2	3	4	5
Temperature (°F)	82	80	78	76	74	72

STEP 1 Graph the ordered pairs from the table (time, temperature). STEP 2 Draw a line through the points. STEP 3 Choose two points on the graph to find the slope: for example, choose (0, 82) and (1, 80). $m = \frac{y_2 - y_1}{x_2 - x_1}$ Use the slope formula. $m = {80 - 82 \over 1 - 0}$ Substitute (0, 82) for (x_1, y_1) and (1, 80) for (x_2, y_2) . $m = \frac{-2}{1} = -2$ Simplify. STEP 4 Read the *y*-intercept from the graph.

Tank Temperature

8.F.2.4





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Math Talk **Mathematical Practices**

Which variable in the equation y = mx + b shows the initial temperature of the fish tank at the beginning of the experiment?



y = -2x + 82

STEP 5

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y = mx + b

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y = 0.06x + 8

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Slope-intercept form

Substitute 0.06 for m and 8 for b.

Reflect

2. What is the base price for the cell phone plan, regardless of how many minutes are included? What is the cost per minute? Explain.

3.	What If? Elizabeth's c as shown below. Write	ell pho e an equ	ne cor uation	npany in slo	chang pe-inte	ges th ercept	e cost : form	of her plator	in ent	
	the situation. How did	the pla	an cha	nge?		1	7			
	Minutes included, x	100	200	300	400	500	_			
	Cost of plan (\$), y	30	35	40	45	50				
										Math Talk
									Explai	Mathematical Practices
									slop	e and y-intercept of the equation.
/OU									7	
4.	A salesperson receives computer sold. The tal	a weel ole sho	kly sala ws the	ary plu total	is a co pay, <i>p</i> ,	mmis , and t	sion fo he nu	or each Imber	v	
	represent this situation	vrite ar h.	i equa	tion ir	i siope	e-Inter	сертт	orm to		
	Number of computers sold, <i>n</i>	4	6	8		10	12			
	Total pay (\$) <i>, p</i>	550	700	85	0 10	000	1150			
		1						J		
5.	To rent a van, a moving	g comp	any cl	harges	; \$40.0 numb	0 plu: er of r	; \$0.5(niles () per mile. driven <i>d</i>		
	Write an equation in s	lope-in	tercep	t form	to rep	preser	it this	situation.		
	Number of miles driven, <i>d</i>	10	20	30)	40	50			
	Total cost (\$), c	45	50	55	5 6	50	65			Porconal
						I				Math Trainer
										Unline Assessment and Intervention
-							-			() my.hrw.com
	Total cost (\$), c	45	50	55	5 (50	65			Personal Math Trainer Online Assessment and Intervention

Lesson 5.2 135

Guided Practice

 Jaime purchased a \$20 bus pass. Each time he rides the bus, a certain amount is deducted from the pass. The table shows the amount, y, left on his pass after x rides. Graph the data, and find the slope and y-intercept from the graph or from the table. Then write the equation for the graph in slope-intercept form. (Example 1)

Number of rides, x	0	4	8	12	16
Amount left on pass (\$), y	20	15	10	5	0



The table shows the temperature (y) at different altitudes (x). This is a linear relationship. (Example 2)

Altitude (ft), <i>x</i>	0	2,000	4,000	6,000	8,000	10,000	12,000
Temperature (°F), y	59	51	43	35	27	19	11

- **2.** Find the slope for this relationship.
- **3.** Find the *y*-intercept for this relationship.
- **4.** Write an equation in slope-intercept form that represents this relationship.
- **5.** Use your equation to determine the temperature at an altitude of 5000 feet.

ESSENTIAL QUESTION CHECK-IN

6. Describe how you can use the information in a table showing a linear relationship to find the slope and *y*-intercept for the equation.

5.2 Independent Practice

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7. The table shows the costs of a large cheese pizza with toppings at a local pizzeria. Graph the data, and find the slope and *y*-intercept from the graph. Then write the equation for the graph in slope-intercept form.

Number of toppings, t	0	1	2	3	4	5
Total cost (\$), C	8	10	12	14	16	18



Number of hours (h), t	0	1	2	3	4	5
Amount charged (\$), A	50	100	150	200	250	300



9. A friend gave Ms. Morris a gift card for a local car wash. The table shows the linear relationship of how the value left on the card relates to the number of car washes.

Number of car washes, x	0	8	12
Amount left on card (\$), y	30	18	12

a. Write an equation that shows the number of dollars left on the card.

b. Explain the meaning of the negative slope in this situation.

c. What is the maximum value of x that makes sense in this context? Explain.

The tables show linear relationships between x and y. Write an equation in slope-intercept form for each relationship.

10.	x	-2	-1	0	2
	у	-1	0	1	3

11.	x	-4	1	0	6
	у	14	4	б	—б



Class



Date



- **12.** Finance Desiree starts a savings account with \$125.00. Every month, she deposits \$53.50.
 - **a.** Complete the table to model the situation.

Month, x			
Amount in			
Savings (\$), y			

- **b.** Write an equation in slope-intercept form that shows how much money Desiree has in her savings account after *x* months.
- **c.** Use the equation to find how much money Desiree will have in savings after 11 months.
- **13.** Monty documented the amount of rain his farm received on a monthly basis, as shown in the table.

Month, x	1	2	3	4	5
Rainfall (in.), y	5	3	4.5	1	7

- a. Is the relationship linear? Why or why not?
- **b.** Can an equation be written to describe the amount of rain? Explain.



- **14.** Analyze Relationships If you have a table that shows a linear relationship, when can you read the value for *b*, in y = mx + b, directly from the table without drawing a graph or doing any calculations? Explain.
- **15.** What If? Jaíme graphed linear data given in the form (cost, number). The *y*-intercept was 0. Jayla graphed the same data given in the form (number, cost). What was the *y*-intercept of her graph? Explain.

Work Area