Name: _____
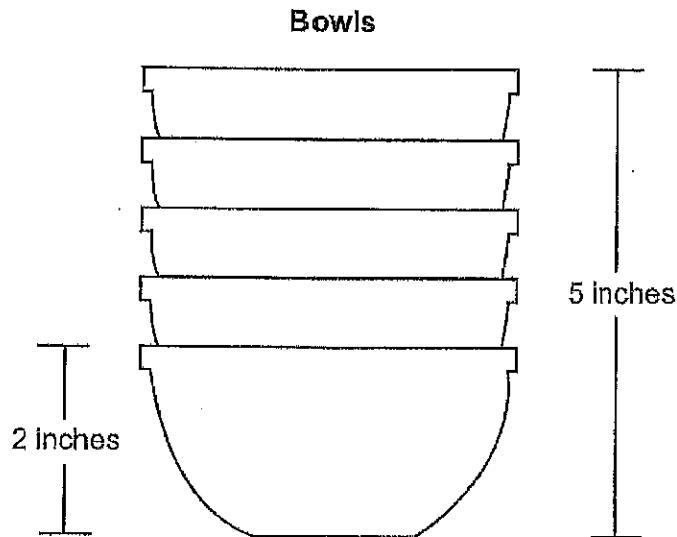
Test 4: Unit 6 Constructed Response

MODULE 1—Operations and Linear Equations & Inequalities

Standard A1.1.2

The diagram below shows 5 identical bowls stacked one inside the other.

Bowls

5 inches

2 inches

The height of 1 bowl is 2 inches. The height of a stack of 5 bowls is 5 inches.

> **A.** Write an equation using x and y to find the height of a stack of bowls based on any number of bowls.
>
>
>
> equation: _____

Continued. Please refer to the previous page for task explanation.

B. Describe what the *x* and *y* variables represent.

x-variable: _____

y-variable: _____

C. What is the height, in inches, of a stack of 10 bowls?

height: _____ inches

CONSTRUCTED-RESPONSE ITEMS

11. A large washtub already contains 6 gallons of water. A faucet is turned on and continues to fill the washtub at a rate of $\frac{1}{2}$ gallon per minute.

A. How many total gallons of water will be in the washtub when the faucet has been on for 5 minutes?

_____ gallons

When the faucet has been on for x minutes, there will be y gallons of water in the washtub.

B. Write a linear equation to model the number of gallons of water (y) in the washtub x minutes after the faucet has been turned on.

linear equation: _____

C. Using your equation, determine the number of minutes from when the faucet is turned on until there are exactly $23\frac{3}{4}$ gallons of water in the washtub.

_____ minutes

Go to the next page to finish question 11.

11. *Continued.* Please refer to the previous page for task explanation.

A second washtub already contains 2 gallons of water. A larger faucet is used to fill this washtub at a rate $1\frac{1}{2}$ times the rate of the first faucet.

Both faucets are turned on at the same time.

D. Determine the number of minutes until both washtubs contain the same number of gallons of water.

_____ minutes

MODULE 2 — Linear Functions and Data Organizations

ASSESSMENT ANCHOR
A1.2.2   Coordinate Geometry

Sample Exam Questions

Standard A1.2.2

Georgia is purchasing treats for her classmates. Georgia can spend exactly $10.00 to purchase 25 fruit bars, each equal in price. Georgia can also spend exactly $10.00 to purchase 40 granola bars, each equal in price.

A. Write an equation which can be used to find all combinations of fruit bars (x) and granola bars (y) that will cost exactly $10.00.

equation: _____

B. Graph the equation from **part A** below.
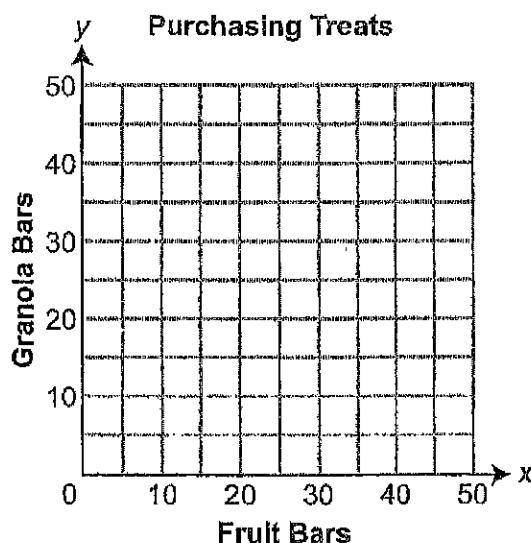
Purchasing Treats

Continued. Please refer to the previous page for task explanation.

C. What is the slope of the line graphed in **part B**?

slope: _____

D. Explain what the slope from **part C** means in the context of Georgia purchasing treats.

MODULE 2—Linear Functions and Data Organizations

Standard A1.2.1

Last summer Ben purchased materials to build model airplanes and then sold the finished models. He sold each model for the same amount of money. The table below shows the relationship between the number of model airplanes sold and the running total of Ben's profit.

Ben's Model Airplane Sales

Model Airplanes Sold	Total Profit
12	$68
15	$140
20	$260
22	$308

A. Write a linear equation, in slope-intercept form, to represent the amount of Ben's total profit (y) based on the number of model airplanes (x) he sold.

$y =$ _____

B. How much did Ben spend on his model-building materials?

$ _____

Continued. Please refer to the previous page for task explanation.

C. What is the fewest number of model airplanes Ben needed to sell in order to make a profit?

fewest number: _____

D. What is a reasonable value in the range that would be a negative number?

range value: _____

**51.** Matt is saving money. He makes $8 per hour at his job and has already saved $42.

A. Write an equation relating the number of hours (x) Matt works at his job to the total amount saved (y), if he saves all of his earnings.

_____

B. Use your equation to fill in the missing values in the table.

Hours Worked (x)	Total Dollars Saved (y)
6	90
12	
18	
24	

C. Graph the table of values on the coordinate plane. Label each axis and provide a title.
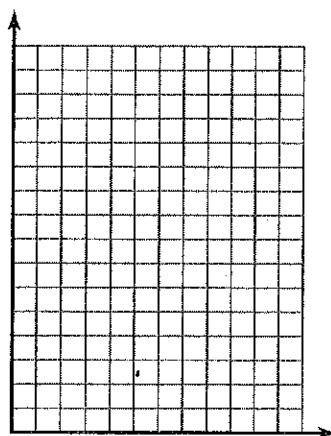
D. Does the graph that you made represent a function? Explain why or why not.
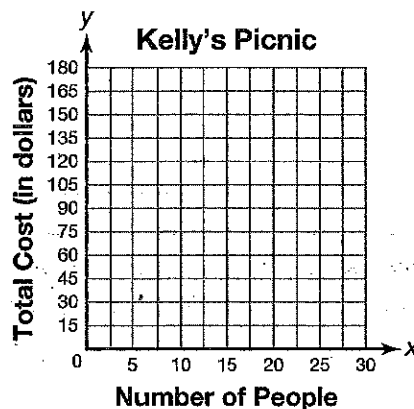
_____

_____

53. Kelly is having a picnic at the park. To rent the shelter, it will cost her $15. She also estimates that the cost of food will be $6 per person. The table shows the relationship between the number of people invited to the picnic and the total cost of the picnic.

Number of People	Total Cost
5	$45
10	$75
15	$105
20	$135
25	$165

A. Write a linear equation, in slope-intercept form, that shows the relationship between the number of people (*x*) and the **total cost** of the picnic (*y*).

B. Use your equation to determine how much it will cost if 17 people attend the picnic.

C. On the coordinate plane below, graph the points that represent the values in the table and draw a line through them.

Kelly's Picnic

Total Cost (in dollars)

180
165
150
135
120
105
90
75
60
45
30
15
0   5   10   15   20   25   30

Number of People

D. If the cost of the shelter is reduced by $5 and Kelly reduces the food cost by $1 per person, what will be the new equation for determining the **total cost** of the picnic?
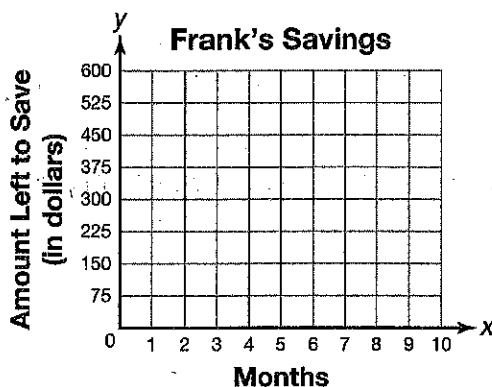
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52. Frank needs to save $600 to buy a set of golf clubs. He plans to save $75 per month.

A. Write an equation that Frank can solve to determine the amount of money he still has to save (y) in relation to the number of months (x) in which he has saved money.

B. Graph the equation on the coordinate plane.

Frank's Savings

Amount Left to Save (in dollars)

600
525
450
375
300
225
150
75

0   1   2   3   4   5   6   7   8   9   10

Months

C. What is the slope of the line that you graphed in **Part B**?

D. Explain what the slope from **Part C** means.

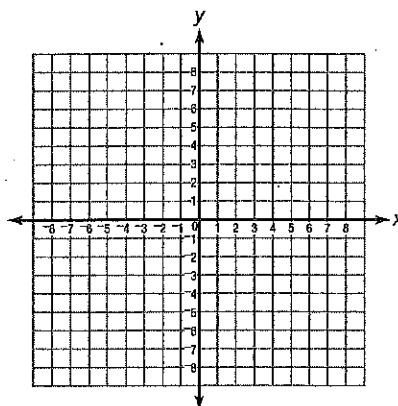**54.** A table of ordered pairs is shown.

x	y
−1	6
0	3
2	−3
3	−6

A. Graph the ordered pairs from the table on the coordinate plane below, and draw a line through them.

B. Find the rate of change of the line you drew in **Part A**.

_____

C. Write the equation of the line in slope-intercept form.

_____

D. Use the concept of slope to explain why the point (−100, 300) is **not** on the line.

_____

_____

STOP

Read the problem. Write your answer for each part.

2. Padma rented a bike for x hours and a kayak for y hours while she was on vacation.

   A She rented the bike and kayak for a total of 7 hours. Write an equation to represent this situation.

   Answer: _____

   The bike cost $6 an hour and the kayak cost $10 an hour. Padma spent a total of $60 for the bike and kayak rentals.

   B Write an equation to represent this situation.

   Answer: _____

C How many hours did Padma rent the kayak? Show or explain
your work.

Answer: _____

Read the problem. Write your answer for each part.

3. The table shows how the length of Alex's pet lizard is changing over time.

PET LIZARD GROWTH

Age (years)	Length (centimeters)
1	5.0
2	7.4
3	9.8
4	12.2
5	14.6

A Write an equation using x and y to find the length of the lizard based on its age.

Answer: _____

B Describe what the x and y variables represent in your equation.

C Use your equation to predict the length of the lizard when it is 12 years old. Show your work.

Answer: _____

Read the problem. Write your answer for each part.

2. Justin works at a shop that prints T-shirts. The table shows how the cost of printing T-shirts depends on the number printed.
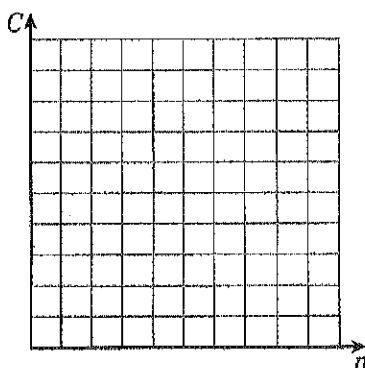
T-SHIRT PRINTING COSTS

Number of T-Shirts	Total Cost (dollars)
20	110
30	135
40	160
50	185
60	210

A Write an equation to show the relationship between n, the number of T-shirts printed, and C, the total cost in dollars.

Answer: _____

B Graph your equation on this coordinate plane. Be sure to include an appropriate scale on each axis.

C What would be the total cost of an order of 120 T-shirts?

Answer: _____

D Explain how you found your answer to **part C.**

Read the problem. Write your answer for each part.

5. Olivia bought a houseplant that was 8 inches tall. It began growing taller at a rate of 2 inches every 3 months.

   A Let h represent the plant's height in inches t months after Olivia bought it. Complete the table below to show the values of h for $t = 0, 3, 6, 9,$ and 12.

t	h

   B Write an equation that describes the relationship between t and h.

   Answer: _____

   C Use your equation to find how many months it will take the plant to reach a height of 21 inches. Show your work.

   Answer: _____

Read the problem. Write your answer for each part.

1. There is a linear relationship between the number of people in a group and the cost to enter a museum. The museum charges $20 for two people and $28 for three people.

   A. Write the equation in slope-intercept form that relates the number of people in a group to the cost of entering the museum. Show your work.

   Answer: _____

   B. How much will it cost for a single individual to enter the museum?

   Answer: _____

   C. How many people can enter the museum for $100?

   Answer: _____

Read the problem. Write your answer for each part.

3. Ashley is the manager of a theater. She has $240 to spend on posters to advertise a new play. Ashley can spend exactly $240 to print 48 small posters. She can also spend exactly $240 to print 30 large posters.

   A Write an equation that can be used to find all combinations of small posters (x) and large posters (y) that will cost exactly $240.

   Answer: _____

   B Graph your equation from **part A** below.

PRINTING POSTERS

Number of Large Posters

Number of Small Posters
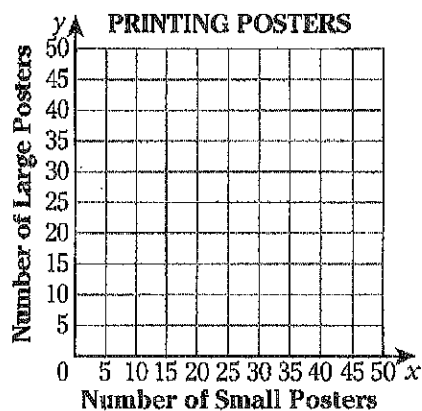
C What is the slope of the line you graphed in **part B**?

Answer: _____

D Explain what the slope from **part C** means in this situation.

Read the problem. Write your answer for each part.

5. A kitchen sink is draining very slowly. The graph shows how the amount of water in the sink is changing over time.

DRAINING THE KITCHEN SINK
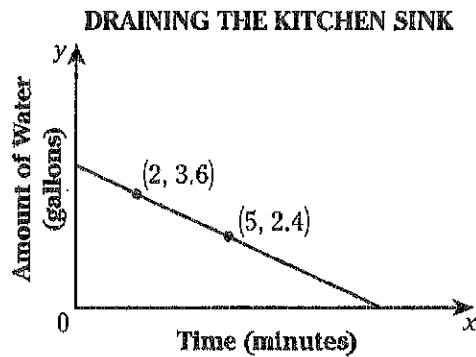
A Find the slope of the line in the graph.

Answer: _____

B Write an equation of the line in point-slope form.

Answer: _____

C Find the x- and y-intercepts of the line.

Answer: _____ and _____

D Explain the meaning of the x- and y-intercepts in this situation.

12. A large bucket that is full of water has a small leak on the bottom. The bucket loses water at the rate of 0.5 gallon per minute. After 6 minutes the bucket contains exactly 9 gallons of water.

A. How many gallons of water were initially in the bucket?

_____ gallons

B. Write an equation in point-slope form to model the number of gallons (*y*) of water in the bucket after *x* minutes.

point-slope equation: _____

Go to the next page to finish question 12.

12. *Continued.* Please refer to the previous page for task explanation.

C. How many minutes does it take for the bucket to lose 7.5 gallons of water?

_____ minutes

D. What is the total number of minutes it will take for the bucket to be completely empty?

_____ minutes

CONSTRUCTED-RESPONSE ITEM

13. Javier has a website on which he posts photos and videos. The day he started the website, he posted 12 photos and no videos. For each day after he started the website, he posts 4 new photos and 1 new video.

A. Complete the table below to show the total number of photos and the total number of videos that are on the website based on the number of days since Javier started the website.

Photos and Videos on Javier's Website

Days since Starting Website	Photos on Website	Videos on Website
0	12	0
1	16	1
2		
3		

B. Write the rate of change in the total number of photos on the website each day since Javier started the website.

rate of change: _____

C. Write a linear equation to show the relationship between the total number of videos (*v*) on the website and the number of days (*x*) since Javier started the website.
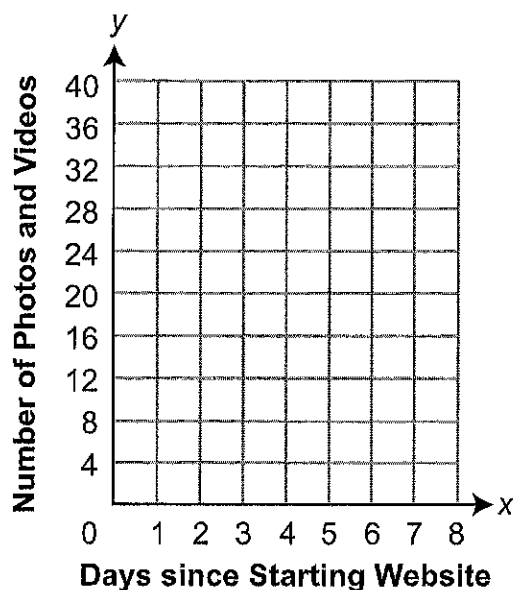
equation: _____

Go to the next page to finish question 13.

GO ON ▶

13. *Continued.* Please refer to the previous page for task explanation.

D. Draw a line on the coordinate grid to show the relationship between the **combined** number of photos and videos (*y*) on the website and the number of days (*x*) since Javier started the website.
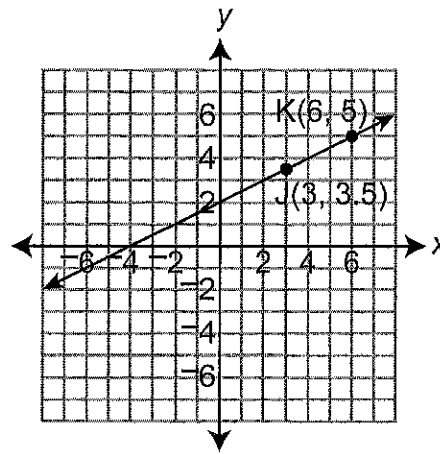
Photos and Videos on Javier's Website

AFTER YOU HAVE CHECKED YOUR WORK, CLOSE YOUR ANSWER BOOKLET AND TEST BOOKLET SO YOUR TEACHER WILL KNOW YOU ARE FINISHED.

STOP

CONSTRUCTED-RESPONSE ITEM

14. Points J and K lie on the same line, as shown on the coordinate plane below.

A. What is the slope of the line passing through points J and K? Show or explain all your work.

Go to the next page to finish question 14.

GO ON ▶

14. *Continued.* Please refer to the previous page for task explanation.

B. Write the equation of the line passing through points J and K. Show or explain all your work.

Points L and M are added to the coordinate plane. The slope of $\overleftrightarrow{JK}$ is equal to the slope of $\overleftrightarrow{LM}$.

C. Describe two ways the lines could be related.

AFTER YOU HAVE CHECKED YOUR WORK, CLOSE YOUR ANSWER BOOKLET AND TEST BOOKLET SO YOUR TEACHER WILL KNOW YOU ARE FINISHED.

STOP