Objective | Structure of Linear Equations

Warm-Up

Use properties to rewrite.

1. $5(x - 3)$

2. $-11(-2 + x)$

3. $10(x - 6)$

4. $8 + 5(x + 6)$

Your job at Storage Pros is to create new boxes to ship the company's plastic containers. Storage Pros makes all different shapes and sizes of plastic containers. To ship the containers, the lids are removed, allowing the containers to be stacked. Storage Pros wants to design its shipping boxes so that they will hold two dozen stacks of the plastic containers without lids in stacks of two dozen, regardless of the size or shape of the container.

The table shows the data gathered from measuring the heights of different-sized stacks of the various plastic containers.

Number of Containers	Stack Height (centimeters)	
	Round	Square
1	9	15
2	9.8	15.4
3	10.6	15.8
4	11.4	16.2
5	12.2	16.6
6		
7		
13		

1. What are the variable quantities in this problem situation?

2. What quantity depends on the other?

3. Create a graph for each container shape's stack height in terms of the number of containers used. Determine the bounds and intervals, complete the table, and label your graph clearly. Use the symbols in the legend shown when graphing.

Variable Quantity	Lower Bound	Upper Bound	Interval
Number of Containers			
Stack Height			
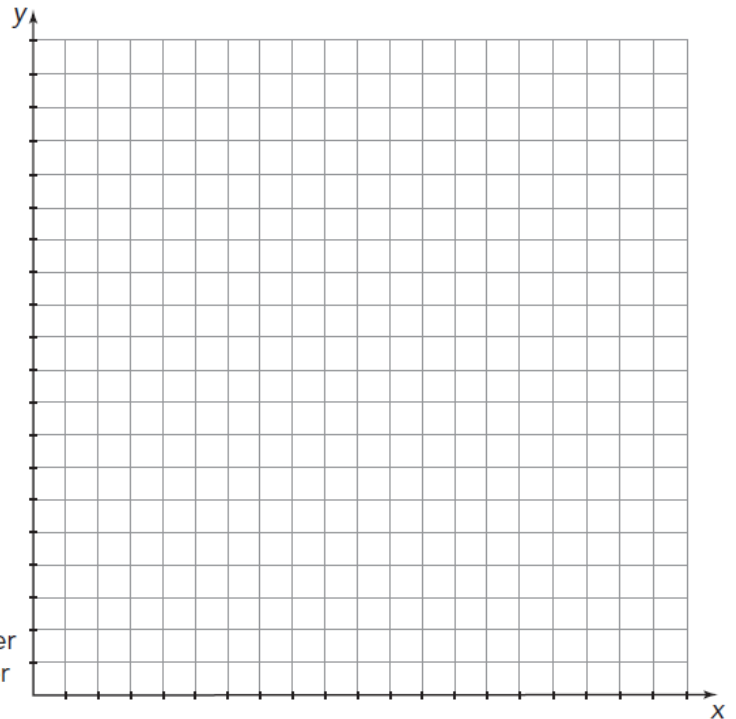
Legend:
■ Square container
● Round container

4. Consider the stack of round containers.

a. What is the height of the first round container?

b. How does the height change when one round container is added to a stack of round containers?

c. Let h represent the stack height. Write an equation that represents the stack height of the round containers in terms of the number of round containers, c, in the stack.

d. Use your table, graph, or equation to determine the stack height of 6, 7, and 13 round containers. Add these values to your table and graph.

5. Consider the stack of square containers.

a. Let c represent the number of containers in a stack of square containers, and let h represent the stack height. Write an equation that gives the stack height in terms of the number of containers in the stack.

b. Use your table, graph, or equation to determine the stack height of 6, 7, and 13 square containers. Add these values to your table and graph.

6. Analyze the equations you wrote for round and square containers.

a. How are the two equations you wrote similar? Why are these equations similar? Explain your reasoning.

b. How are the two equations you wrote different? Why are these equations different? Explain your reasoning.

7. The equations you wrote for the heights of the containers can be rewritten in equivalent forms.

a. Rewrite each equation in the form y = ax + b.

b. Explain what the numbers in the equations mean in terms of the problem context.

c. Refer back to the graph. Explain how the numbers in these equations and your graphs are related.

8. Use your equations of the form y = ax + b to calculate the stack height of:

a. two dozen round containers.

b. two dozen square containers.

9. What height should Storage Pros make its boxes to accommodate the height of a stack of two dozen of either type of container?

10. Storage Pros had extra boxes that were 45 centimeters tall.

a. How many round containers can be in each stack inside the box?

b. How many square containers can be in each stack inside the box?

LESSON 9.2b
Stretches, Stacks, and Structure

Homework
HW

Objective Structure of Linear Equations

Practice

1. Drake's Drugstore is getting ready for the upcoming summer season. The manager of the store wants to add lawn chairs to the stock. He asks the buyer to determine the two lowest priced wholesalers of lawn chairs. The table shows the data that the buyer collects from two wholesalers.

Packs of Chairs	Price from Wholesaler A (dollars)	Price from Wholesaler B (dollars)
1	$90.99	$98.99
2	$173.98	$179.98
3	$256.97	$260.97
4	$339.96	$341.96

a. Let p represent the total number of packs of chairs bought from Wholesaler A and let c represent the total cost. Write an equation to calculate the total cost of any number of packs of chairs.

b. Let p represent the total number of packs of chairs bought from Wholesaler B and let c represent the total cost. Write an equation to calculate the total cost of any number of packs of chairs.

c. Write the equations from parts (a) and (b) in the form y = ax + b.

d. Calculate the cost of eight packs of chairs from each wholesaler.

e. The manager wants to buy at least seven packs of chairs. Which wholesaler should the drugstore use this year? Explain your reasoning.