TOPIC 4

LESSON 4.5a

They're Growing!

6.RP.1
6.RP.3a

Objective: Graphs of Ratios

Warm-Up

A tree grows at a constant rate of 3 feet per year.

1. Write a ratio to represent the amount of growth in feet : the number of months.

2. Create a double number line that describes the growth of the tree every 12 months over a 48-month period.

Growing Rectangles

Consider a rectangle with a short side of length 2 units and a long side of length 3 units.

- In the first table, add the indicated number of units to both the long and short sides of the original rectangle.
- In the second table, multiply each original side length by the given value.
- For each rectangle, determine the ratio of the long side length : short side length.

	Original	+2 units	+3 units	+4 units
Long side	3			
Short side	2			
Ratio	3 : 2			

	Original	×2 units	×3 units	×4 units
Long side	3			
Short side	2			
Ratio	3 : 2			

1. What do you notice about the ratios for rectangles formed by adding to the sides of the rectangle?

2. What do you notice about the ratios for rectangles formed by multiplying the sides of the rectangle by a given value?

EXPLORE 1

Analyzing Rectangle Ratios

Analyze and use the rectangles from the handout.

1. Copy each table into your notebook

2.Fill each space by determining the side lengths of each rectangle.

Ava's Group

	Short	Long	Ratio
A			
C			
E			
F			
G			
J			

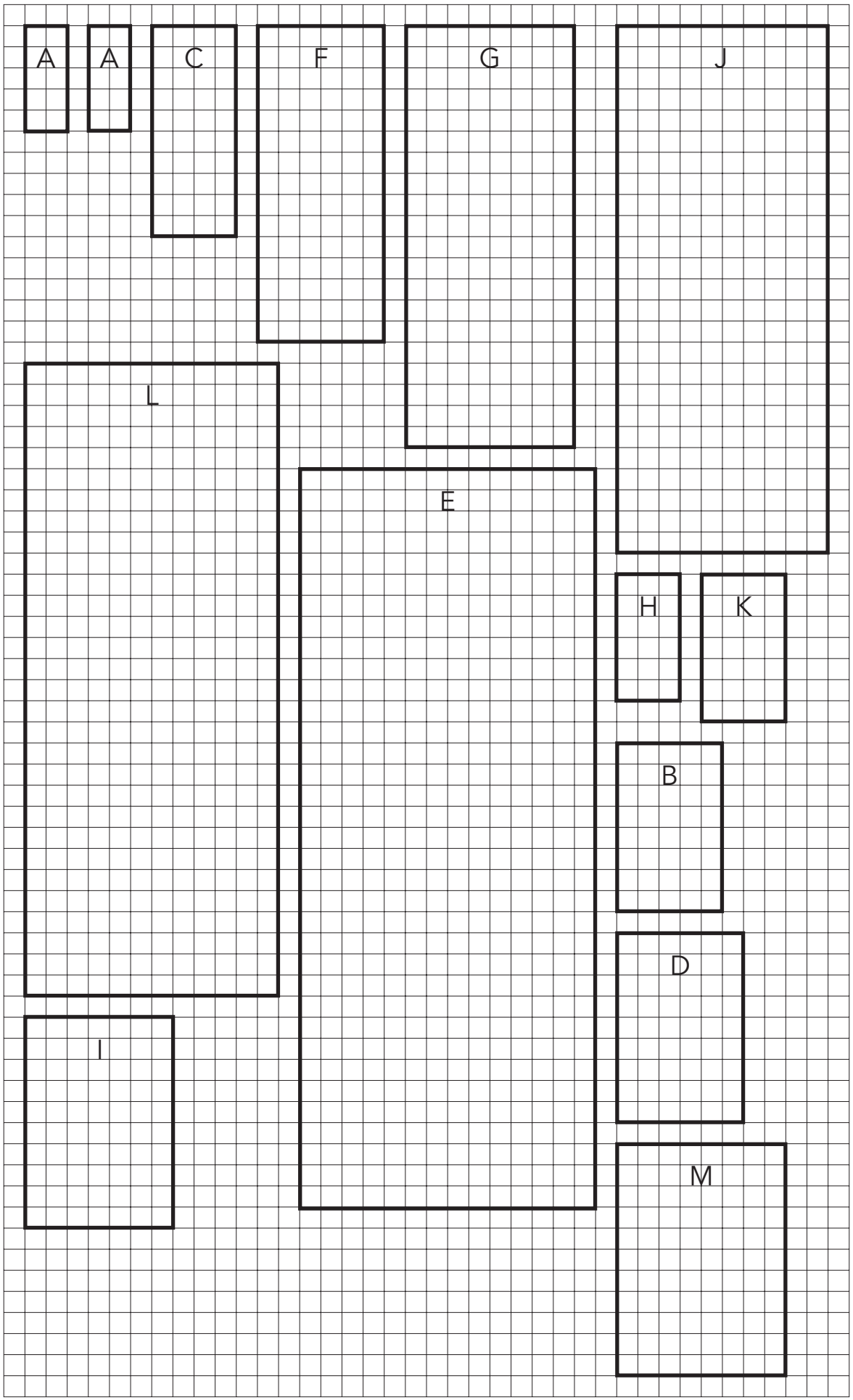
Gabriel's Group

	Short	Long	Ratio
A			
B			
D			
H			
I			
K			

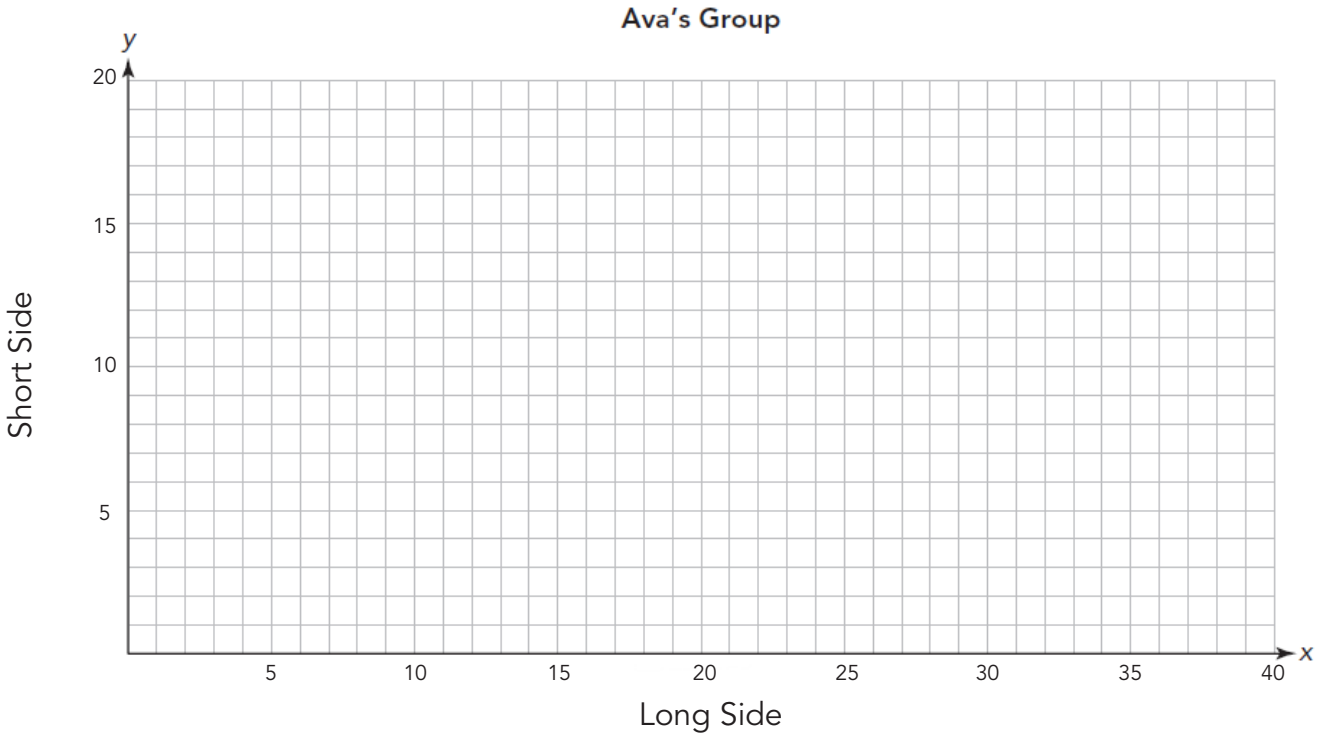
3. Ava grouped together Rectangles A, C, E, F, G, and J. What do you think was her reasoning?

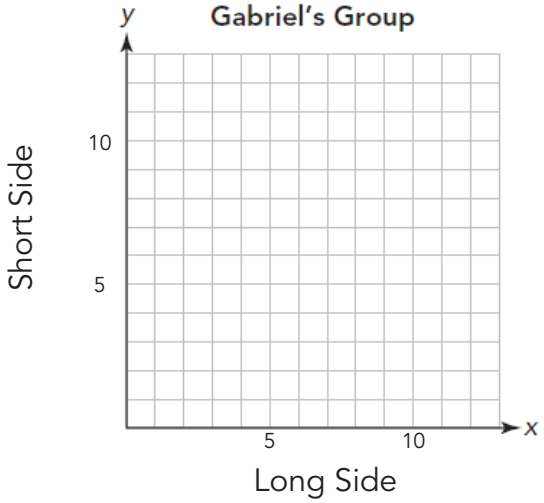
4. Gabriel's sort was similar to Ava's but he included Rectangle A with Rectangles B, D, H, I, and K. What do you think was his reasoning?

5. Write the ratios in fractional form, comparing the length of the short side to the length of the long side. Compare the ratios in each table. What do you notice?


A
A
C
F
G
J
L
E
H
K
B
D
I
M

6. In your notebook use the graph scale below to draw the set of stacked rectangles to the appropriate coordinate grid, with the lower left corner of the rectangles at the origin of the grid.





7. Label the coordinates of the upper right corner of each rectangle. What do you notice about the coordinates in relation to your ratio?

8. Draw a line through the labeled points on each graph. What do you notice about which ordered pairs each line passes through?

Just as equivalent ratios can be represented using tables and double number lines, they can also be represented on the coordinate plane.

When a set of points graphed on a coorfinate place forms a straight line, a linear relationshop exists

The ratio $\frac{y}{x}$ is plotted as the ordered pair (x, y). When you connect the points that represent the equivalent ratios, you form a straight line that passes through the origin, such as with Ava's Group. In contrast, non-equivalent ratios are those represented by points that do not create a straight line through the origin, like Gabriel's Group.

Name: _____ Date: _____ Class: _____

Homework HW

LESSON 4.5a

They're Growing!

Objective Graphs of Ratios

Review

1. Ellen loves to make her own clothes. With 45 yards of cloth, she can make 5 dresses. Create a double number line to explain your reasoning for each question.
   a. If Ellen has 72 yards of cloth, how many dresses can she make?
   b. If Ellen is going to make a dress for herself, how many yards of cloth does she need?

2. A customer used a $10 bill to pay for a 39-cent candy bar. Simone returned 61 cents. What mistake did Simone make? Explain how she should correct her mistake.

3. A grocery store is selling ground beef for $1.89 per pound. How much does it cost to buy 2.5 pounds?

4. Use estimation to place the decimal point in the correct position in each quotient.

   a. $2.1\overline{)48.72} = 232$

   b. $8\overline{)204.8} = 256$