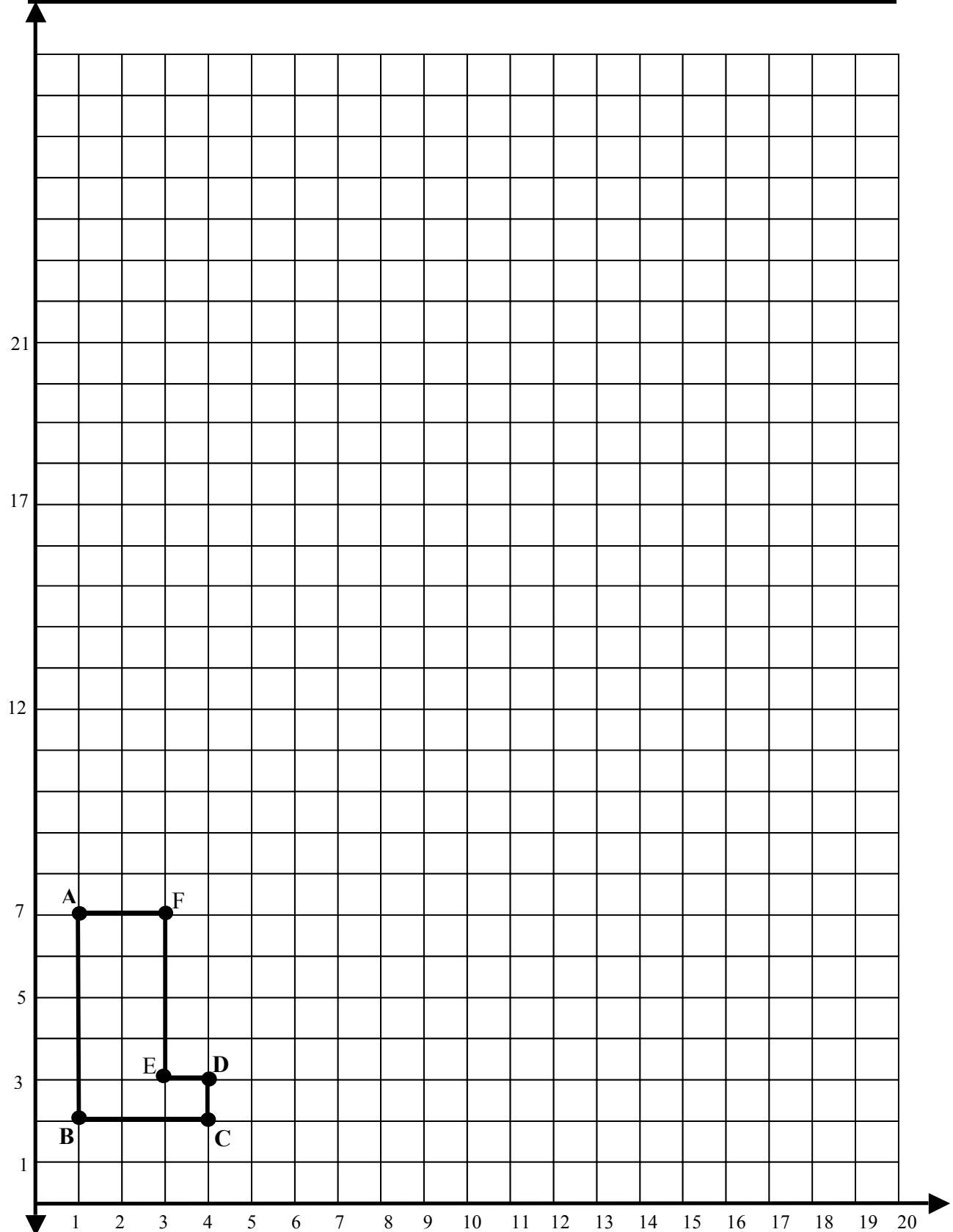


TASK 1.3.3: CHANGING PERIMETERS Y — STUDENT ACTIVITY

Solutions

Task 1.3.3: Changing Perimeters y–Student Activity

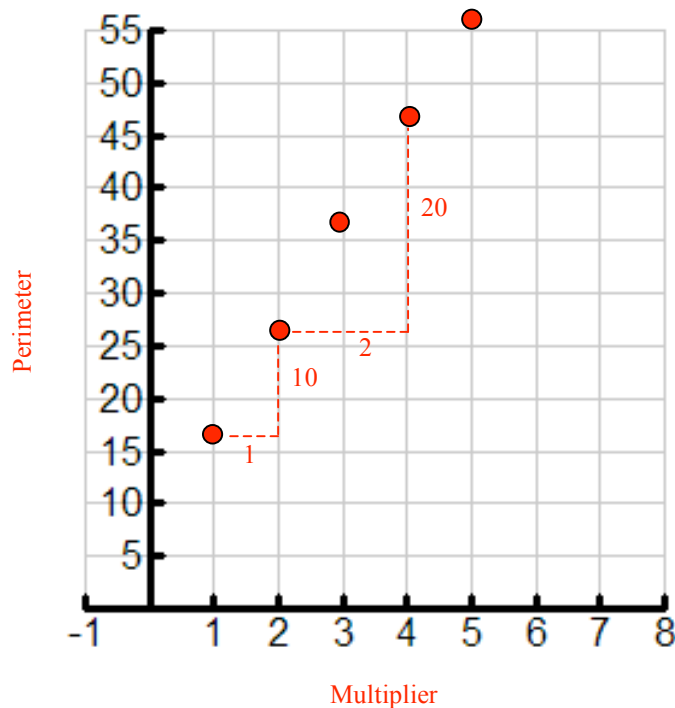
Changes in the y-coordinate

Segment Lengths	AB	BC	CD	DE	EF	FA	Perimeter
Original figure	5	3	1	1	4	2	16
When the y-coordinates are multiplied by 2	10	3	2	1	8	2	26
When the y-coordinates are multiplied by 3	15	3	3	1	12	2	36
When the y-coordinates are multiplied by 4	20	3	4	1	16	2	46
When the y-coordinates are multiplied by 5	25	3	5	1	20	2	56

1. Record the lengths and perimeter of polygon ABCDEF (Figure 1) in the table.
2. Multiply each y -coordinate of the vertices in Figure 1 by 2. Using a colored pencil, draw the new Figure 2. Determine the side lengths and perimeter of Figure 2 and enter them in the table.
3. Multiply each original y -coordinate of the vertices in Figure 1 by 3. Using a different colored pencil, draw the new Figure 3. Determine the side lengths and perimeter of Figure 3 and enter them in the table.
4. Multiply each original y -coordinate of the vertices in Figure 1 by 4. Using a different colored pencil, draw the new Figure 4. Determine the side lengths and perimeter of Figure 4 and enter them in the table.
5. Multiply each original y -coordinate of the vertices in Figure 1 by 5. Without drawing the new figure, determine its perimeter. Enter the perimeter in the table.

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6. On the grid provided create a scatter plot of perimeter vs. y-multiplier. Label the axes.



7. Describe the functional relationship and include a reasonable range and domain.
 The perimeter depends on the multiplier. The domain for this data is the set of integers from 1 to 5; the range for this data is 16, 26, 36, 46, 56.
8. How is the perimeter changing?
 The perimeter is growing by 10 units each time the y-coordinate is multiplied.
9. Use your drawings to show how the perimeter is changing.
 Student answers may vary.
10. Use the table to show how the perimeter is changing.
 See table.
11. Use the graph of the perimeter vs. the multiplier to show how you see the perimeter changing.
 See graph.
12. What would happen if the y-multiplier were zero?
 If the y-multiplier were zero, all the values of y would become 0. In this case the figure would collapse into a horizontal line (or set of lines) and a line has no

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perimeter. Only 6 x -units would remain. The coordinate (0, 6) has no meaning in this situation.

13. Create an algebraic expression that shows the pattern of the perimeter growing.

$p = 6 + 10m$ (perimeter is 6 plus 10 times the multiplier)

14. If the perimeter were 156 what would the y -multiplier be?

15

15. If the y -multiplier were 21 what would the perimeter be?

The perimeter will be 216 units.

16. What does the point (3, 36) on your scatter plot mean?

When the y -coordinate is multiplied by 3, the perimeter is 36.

17. Would the point (25, 266) fit on this scatter plot? Explain.

No, if 25 is the multiplier, the perimeter is 256. You can use the graphing calculator and trace table to find the corresponding y value when x is 25, or you can use 25 as an input value in the function rule to determine the correct perimeter.

18. Did multiplying the y value create a dilation? Explain.

No. A dilation is when all dimensions are changed by the same scale factor. In this situation, only the y -coordinate was changed. This produced a change in the height of the figure, but no corresponding change in the width.

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Teaching notes

Dilations are included in the 8th grade TEKS, however students may not have significant exposure and hands-on experiences to understand the concept. As an introduction to this activity, the teacher may need to review dilations.

Technology notes

Refer to the activity “Stacking Hexagons” for detailed technology notes on using the graphing calculator to find the $\Delta L1/\Delta L2$ as well as $L1/L2$.

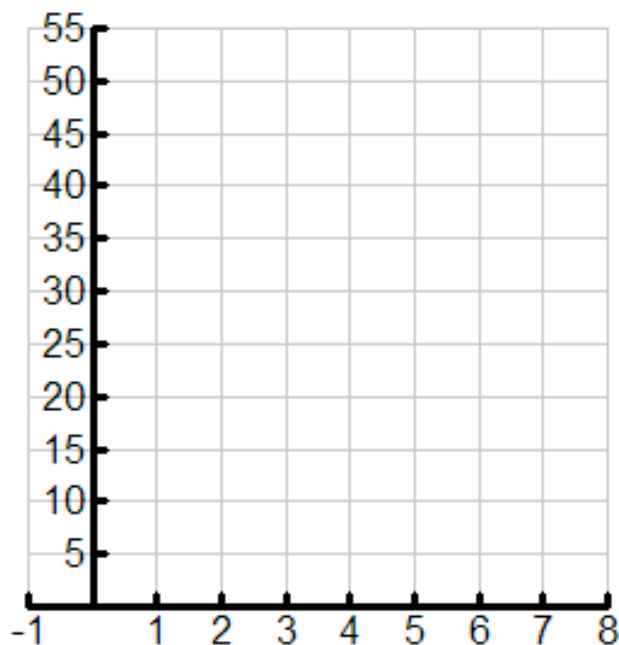
TASK 1.3.3: CHANGING PERIMETERS Y — STUDENT ACTIVITY**Changes in the y -coordinate**

Segment Lengths							Perimeter
Original figure							
When the y -coordinates are multiplied by 2							
When the y -coordinates are multiplied by 3							
When the y -coordinates are multiplied by 4							
When the y -coordinates are multiplied by 5							

- Record the lengths and perimeter of polygon ABCDEF (Figure 1) in the table.
- Multiply each y -coordinate of the vertices in Figure 1 by 2. Using a colored pencil, draw the new Figure 2. Determine the side lengths and perimeter of Figure 2 and enter them in the table.
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6. On the grid provided, create a scatter plot of perimeter vs. y -multiplier. Label the axes.



7. Describe the functional relationship and include a reasonable range and domain.
8. How is the perimeter changing?
9. Use your drawings to show how the perimeter is changing.
10. Use the table to show how the perimeter is changing.
11. Use the graph of the perimeter vs. the multiplier to show how you see the perimeter changing.
12. What would happen if the y -multiplier were zero?
13. Create an algebraic expression that shows the pattern of the perimeter growing.
14. If the perimeter were 156 what would the x -multiplier be?
15. If the x -multiplier were 21 what would the perimeter be?
16. What does the point $(3, 36)$ on your scatter plot mean?
17. Would the point $(25, 266)$ fit on this scatter plot? Explain.
18. Did multiplying the y value create a dilation? Explain.