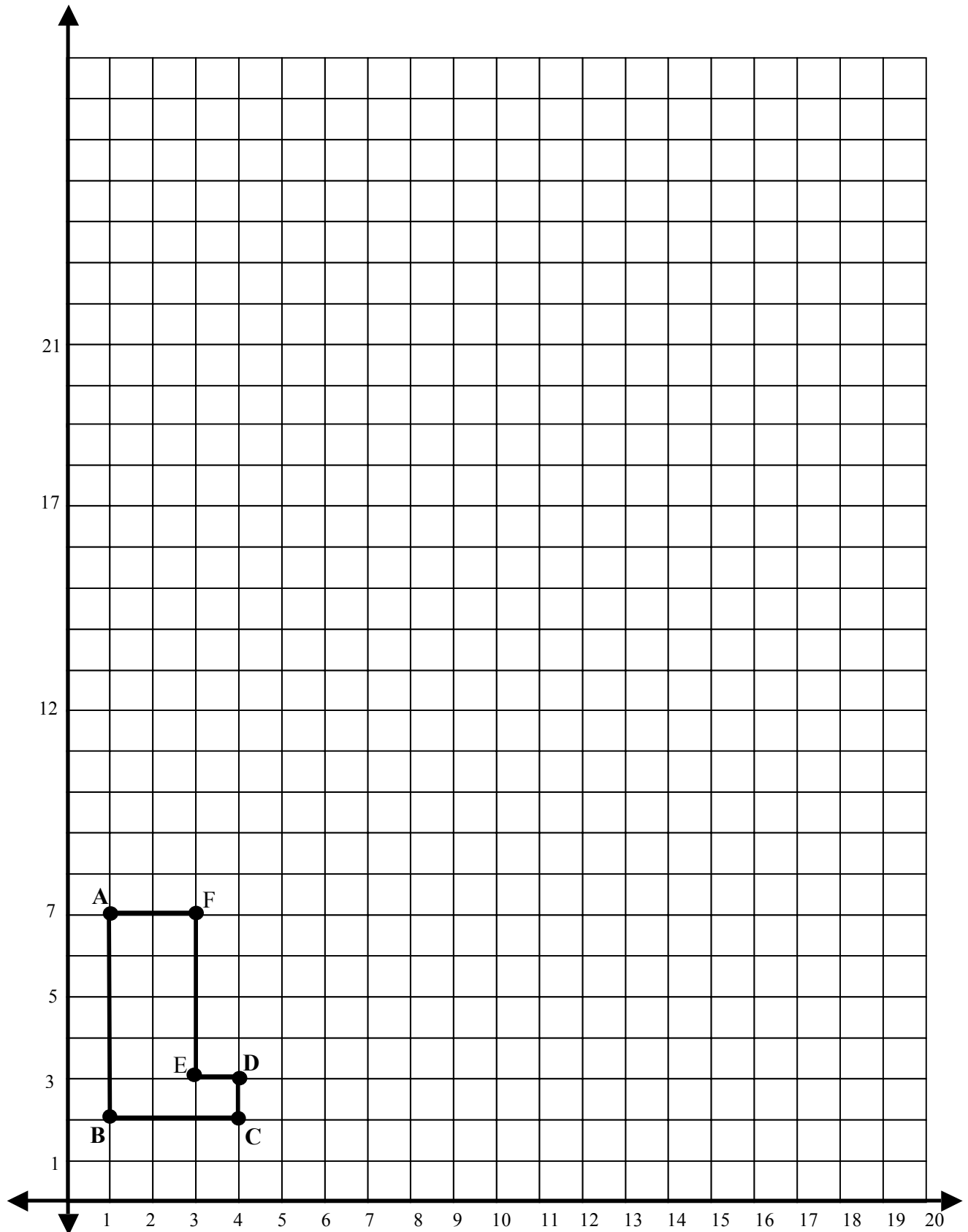


TASK 1.3.2: CHANGING PERIMETERS X — STUDENT ACTIVITY

Solutions

Task 1.3.2: Changing Perimeters x–Student Activity

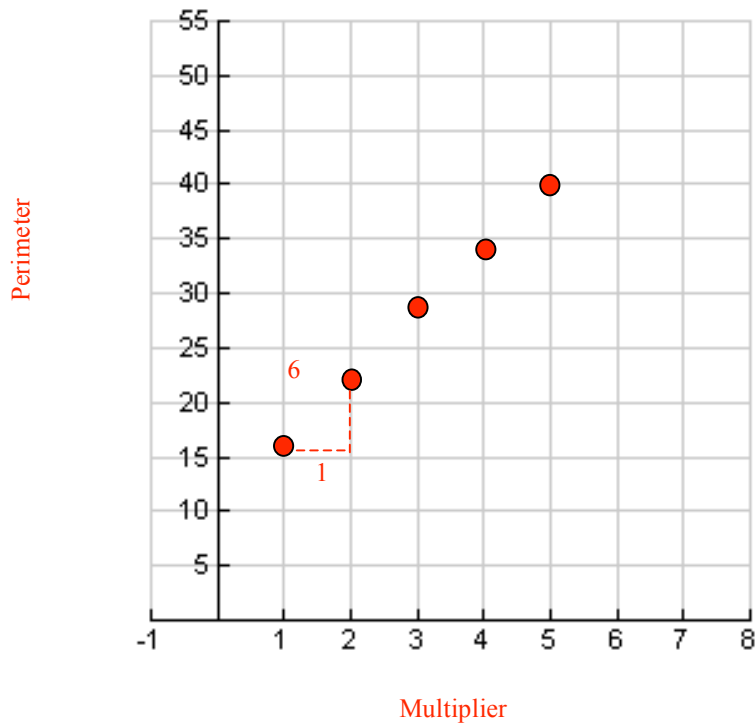
Changes in the x-coordinate

Segment Lengths	AB	BC	CD	DE	EF	FA	Perimeter
Original Lengths	5	3	1	1	4	2	16
When x-coordinates are multiplied by 2	5	6	1	2	4	4	22
When x-coordinates are multiplied by 3	5	9	1	3	4	6	28
When x-coordinates are multiplied by 4	5	12	1	4	4	8	34
When x-coordinates are multiplied by 5	5	15	1	5	4	10	40

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

Algebra I: Strand 1. Foundations of Functions; Topic 3. Changing Perimeter; Task 1.3.2

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



7. Describe the functional relationship and include a reasonable domain and range.
The perimeter depends on the multiplier. The domain for this data is the set of integers from 1 to 5, the range is 16, 22, 28, 34, 40. For each horizontal change of one unit, the vertical change is 6 units.
8. How is the perimeter changing?
The perimeter is growing by 6 with each new multiplier.
9. Use your drawings to show how the perimeter is changing.
Check drawings.
10. Use your table to show how the perimeter is changing.
See table.
11. Show on the scatter plot how you see the perimeter changing.
See graph.

12. What would happen if the x -multiplier were zero?
If x coordinates were multiplied by 0, the x values would all become 0. The figure would have no height, only width of 10 units. In this case, the figure would collapse into a vertical line (or set of lines) and a line has no perimeter. The coordinate point (0, 10) has no meaning in this situation.
13. Create an algebraic expression that shows the pattern of the perimeter growing.
 $y = 6x + 10$ (perimeter is six times the multiplier plus ten)
14. If the perimeter were 232, what would the x -multiplier be? How did you determine this?
The perimeter is an output value. Solving the equation for the corresponding input value would produce 37 as the multiplier. On the graphing calculator, the trace feature or the table function would both show that the corresponding x value for a y value of 232 is 37.
15. If the x -multiplier were 27, what would the perimeter be? How did you determine this?
The multiplier is an input value. Solving the equation for the corresponding output value would produce a perimeter of 172 units. On the graphing calculator, the trace feature or the table function would show that the corresponding y value for an x value of 27 is 172.
16. What does the point (3, 28) on your scatter plot mean?
This coordinate point means that for a multiplier of 3 the perimeter would be 28.
17. Would the point (15, 130) fit on this scatter plot? Explain.
No, the coordinate point (15, 130) would not be part of this data. If the input number were 15, the corresponding output number would be 100. If 130 were used as an output value the corresponding input value would be 20.
18. Did multiplying the x value create a dilation? Explain.
Multiplying the x value does not create a dilation. In a dilation, all dimensions are changed by the same scale factor. In this instance, only the width of the figure is changed.

Teaching notes

Dilations are included in the 8th grade TEKS; students, however, 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 $L1/L2$.

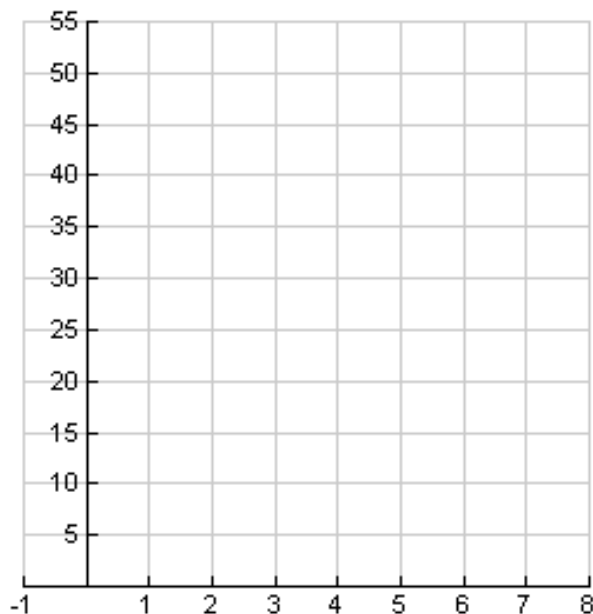
TASK 1.3.2: CHANGING PERIMETERS X — STUDENT ACTIVITY**Changes in the x -coordinate**

							Perimeter
Original Lengths							
When x -coordinates are multiplied by 2							
When x -coordinates are multiplied by 3							
When x -coordinates are multiplied by 4							
When x -coordinates are multiplied by 5							

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

Algebra I: Strand 1. Foundations of Functions; Topic 3. Changing Perimeter; Task 1.3.2

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



7. Describe the functional relationship and include a reasonable domain and range.
8. How is the perimeter changing?
9. Use your drawings to show how the perimeter is changing.
10. Use your table to show how the perimeter is changing.
11. Show on the scatter plot how you see the perimeter changing.
12. What would happen if the x-multiplier were zero? .
13. Create an algebraic expression that shows the pattern of the perimeter growing.
14. If the perimeter were 232, what would the x-multiplier be? How did you determine this?
15. If the x-multiplier were 27, what would the perimeter be? How did you determine this?
16. What does the point (3, 28) on your scatter plot mean? .
17. Would the point (15, 130) fit on this scatter plot? Explain.
18. Did multiplying the x value create a dilation? Explain.