

New Jersey GEPA Grade 8 Open Response: Sample Student Answers

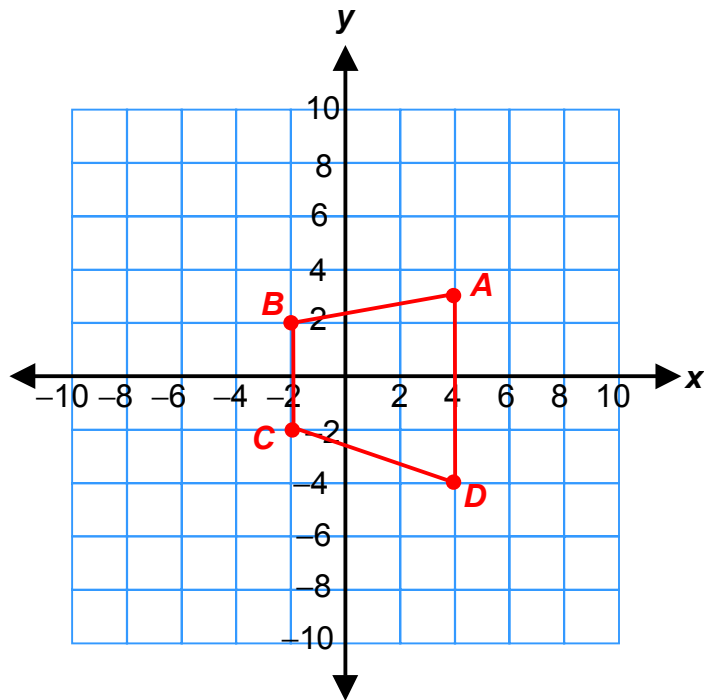
1. On a coordinate plane, plot the following points:

$A(4, 3)$ ;  $B(-2, 2)$ ;  $C(-2, -2)$ ;  $D(4, -4)$

- Label each point, and connect the points. Name the figure formed.
- Draw the figure that results from a dilation by a scale factor of  $-2$ . Label and name each vertex of the new figure.
- Translate the new figure 2 units right and 1 unit up.
- Describe the new image. Explain how the new figure was transformed from the original preimage, which was formed by plotting points  $A, B, C, D$ .

**Solution**

a. trapezoid  $ABCD$



b. trapezoid  $A'B'C'D'$ .

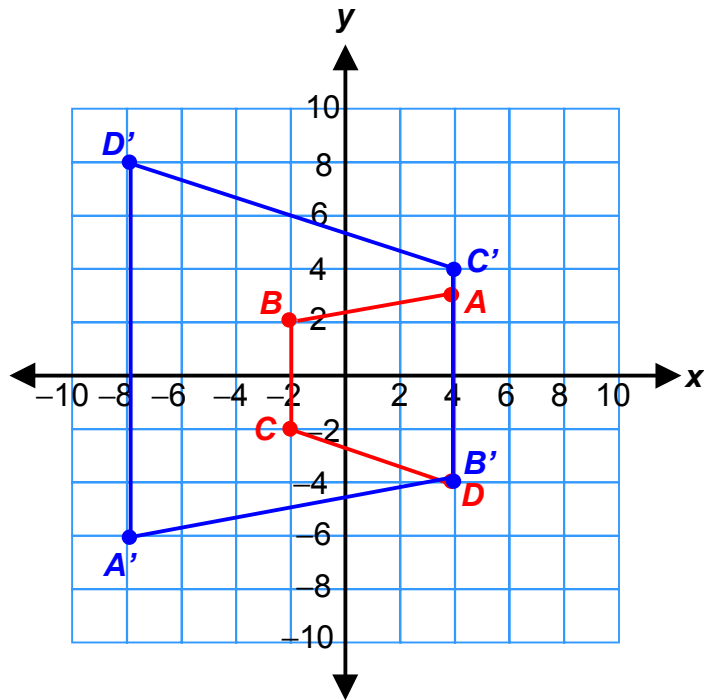
dilation  $D(x, y) = (-2x, -2y)$

$A(4, 3) \rightarrow A'(-8, -6)$

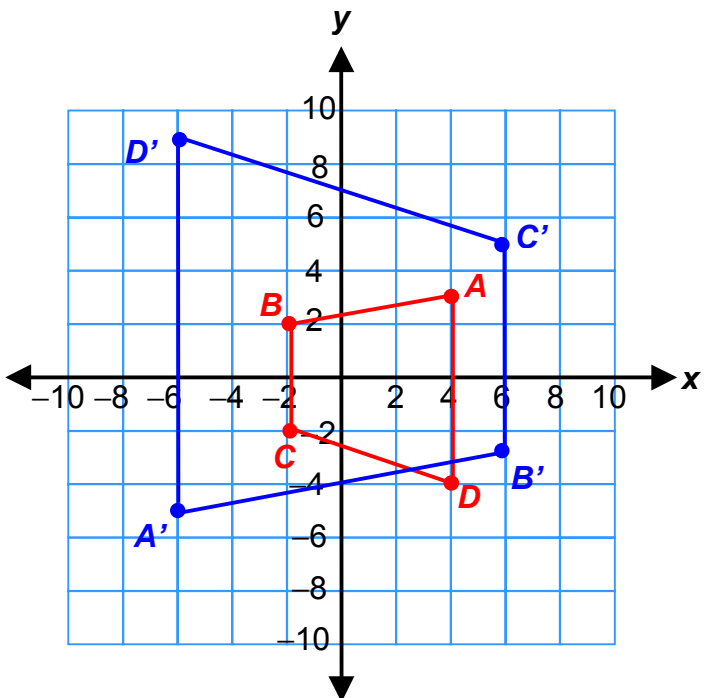
$B(-2, 2) \rightarrow B'(4, -4)$

$C(-2, -2) \rightarrow C'(4, 4)$

$D(4, -4) \rightarrow D'(-8, 8)$



c.



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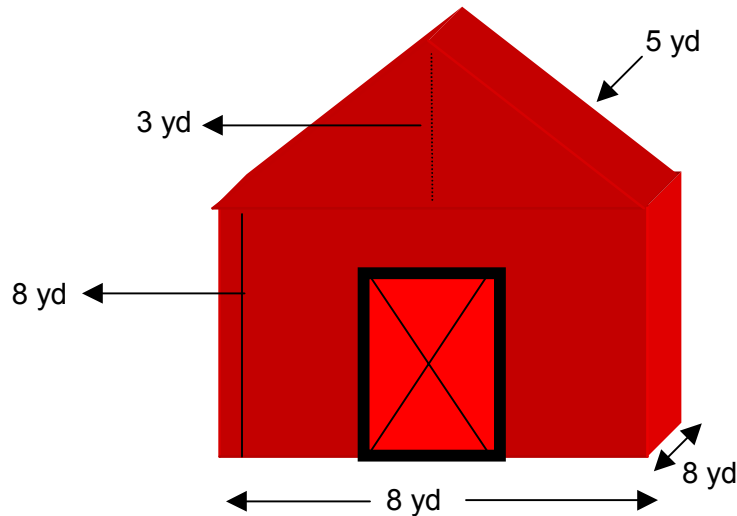
d. The new image is larger and is a reverse of the preimage because the preimage was dilated by a scale factor of  $-2$ . The translation just moved the new image up 1 unit and right 2 units.

Course 3, Lesson 5-7 and Lesson 7-5

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2. Barry needs to paint the outside of his barn. Find the surface area of the outside of the barn to determine the number of gallons of paint needed to cover the barn's surface, and then find the approximate cost of the paint to be purchased. Use the diagram below to show how you found the surface area of the barn. Show all of your work.

- One gallon of paint will cover about 400 square feet.
- One gallon of paint costs \$22.99.



**Solution**

To find the surface area of the barn, first find the areas of the 4 sides of the barn and the 4 sides of the roof. Then add those areas. There are 2 triangles that are part of the roof. The other faces of the structure are rectangles.

The formula for the area of a rectangle is  $A = lw$ .

The formula for the area of a triangle is  $A = \frac{1}{2}bh$ .

$$\begin{aligned} \text{surface area} &= 4(8 \cdot 8) + 2(5 \cdot 8) + \frac{1}{2}(8 \cdot 3) + \frac{1}{2}(8 \cdot 3) \\ &= 256 + 80 + 12 + 12 \\ &= 360 \end{aligned}$$

The surface area of the barn is  $360 \text{ yd}^2$ .

Change the units from square yards to square feet.

$$360 \text{ yd}^2 \cdot \frac{3^2 \text{ ft}^2}{1 \text{ yd}^2} = 3,240 \text{ ft}^2$$

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To find the amount of paint needed, divide the surface area of the barn by the number of square feet that can be covered by a gallon.

$$3,240 \div 400 = 8.1$$

Barry will need to buy 9 gallons of paint. The cost will be  $9 \times 22.99$ , or \$206.91.

Course 3, Lesson 6-8

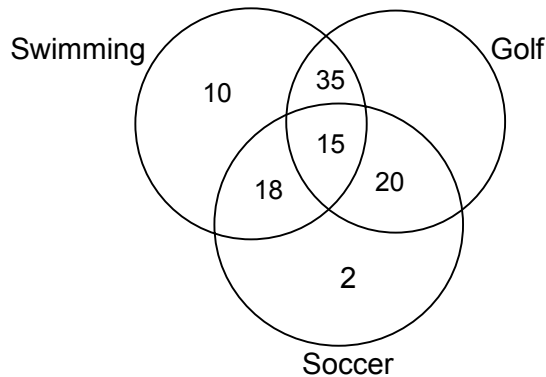
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3. There are 100 students who signed up for the school-sponsored summer sports activities. According to the sign-up sheets, 78 students signed up for swimming classes, 55 students signed up for soccer classes, and 70 students signed up for golf classes. There are 15 students who signed up for all three classes, 35 who signed up for swimming and golf only, 18 who signed up for swimming and soccer only, and 20 who signed up for soccer and golf only.
- Create a Venn diagram to display the information.
  - How many students signed up for golf and soccer, but not swimming?
  - What percent of the students signed up for soccer?
  - What is the probability of randomly selecting a student who had signed up for all three sports?

Show all of your work, and explain how you found your answers.

**Solution**

a.



- There are 20 students who signed up for golf and soccer.
- Of the students, 55% signed up for soccer.
- The probability of randomly selecting a student who signed up for all three sports is 0.15 or 15%.

Course 3, Lesson 9-4 and Course 2, Chapter 12 Extension

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4. Brenda canned 15 quarts of tomatoes, 18 quarts of green beans, and 25 quarts of applesauce for the winter. If there is a severe winter storm, she can use 10% of the original amount of the tomatoes each day, 15% of the original amount of green beans each day, and 20% of the original amount of applesauce each day for a period of time until she is able to replenish her supply of food.
- How many days will it take for there to be more quarts of tomatoes than quarts of applesauce?
  - If the storm lasts for 5 days, about how many quarts of green beans will she have left?
  - Explain in detail how you found your answer.

**Solution**

Day	10% of Tomatoes (qt)	15% of Green Beans (qt)	20% Applesauce (qt)
starting amount	15	18	25
1	13.5	15.3	20
2	12.0	12.6	15
3	10.5	9.9	10
4	9.0	7.2	5
5	7.5	4.5	0

- It will take 3 days for there to be more quarts of tomatoes than quarts of applesauce.
- There will be about 4.5 quarts of green beans left after a 5-day winter storm.
- I used a table to organize the information. Then I multiplied each quantity by the percentage to be used on a daily basis and filled in the table. I then read the table to find the answers to the questions.

Course 3, Lesson 8-7

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5. The price of a ticket to a professional basketball game depends upon where the seat is located. The table below shows the cost per ticket to a game.

Location	Price per Ticket	Number of Seats
Courtside: Rows 1 through 5	\$250	300
Rows 6 through 25	\$100	1,500
Mid-level	\$50	12,500
Upper Level	\$25	22,000

- Write an expression to show how the cost of a certain number of each ticket is calculated.
- What is the ratio between the cost of a mid level ticket to a courtside ticket in row 3?
- For a championship game the cost of each ticket increases by 150%. How does this change the value of the price of each ticket type?

**Solution**

a.

Location	Expression
Court Side: Rows 1–5	$C = \$250t$
Rows 6–25	$C = \$100t$
Mid-level	$C = \$50t$
Upper Level	$C = \$25t$

- b. The ratio between the ticket price of a mid-level seat and the ticket price of a courtside seat is 1:5.

c.

Location	Ticket Cost
Court Side: Rows 1–5	\$625
Rows 6–25	\$250
Mid-level	\$125
Upper Level	\$62.50

Course 3, Lesson 1-2, Lesson 7-1, and Lesson 8-4

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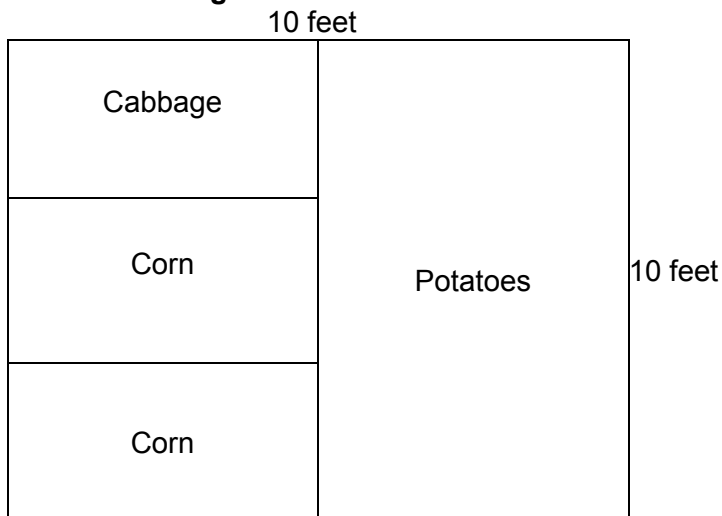
6. Mr. Gomez is planning a vegetable garden. He has enough fertilizer to have a  $100 \text{ ft}^2$  garden. He would like to plant twice as much corn as cabbage. However, half of the garden must be reserved for potatoes.

Design two different garden plans that will meet Mr. Gomez's requirements.

- Calculate the perimeter of the garden for each design.
- Mr. Gomez would like to add a 6-inch border of marigolds around the garden. Explain how this border would affect the total area of the garden in each design.

**Solution**

**Possible design #1:**

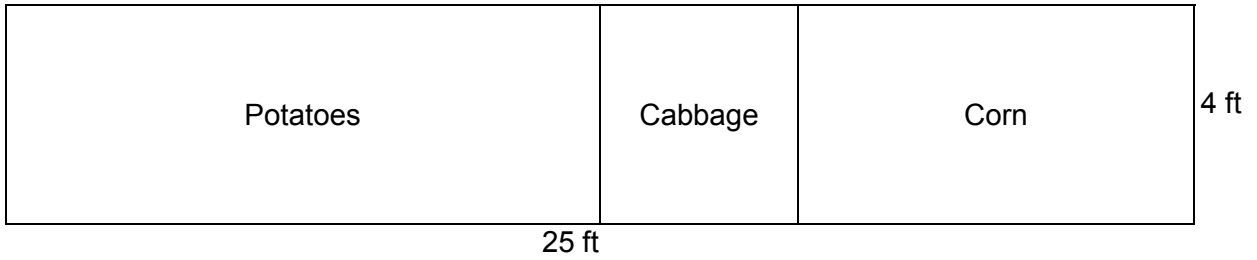


a. perimeter = 40 ft

b. Overall area =  $121 \text{ ft}^2$ ; adding the border of marigolds would increase the overall area by  $21 \text{ ft}^2$ .

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**Possible design #2:**



a. perimeter = 58 ft

b. Overall area = 130 ft<sup>2</sup>; adding the border of marigolds would increase the overall area by 30 ft<sup>2</sup>.

Course 3, Lesson 6-1