

# Geoboard Dilations

| TYPES OF ALGEBRAIC RULES      |                                     |
|-------------------------------|-------------------------------------|
| Reflection over x-axis        | $(x, y) \rightarrow (x, -y)$        |
| Reflection over y-axis        | $(x, y) \rightarrow (-x, y)$        |
| Translation                   | $(x, y) \rightarrow (x + a, y + b)$ |
| Dilation                      | $(x, y) \rightarrow (kx, ky)$       |
| Rotation 90° counterclockwise | $(x, y) \rightarrow (-y, x)$        |
| Rotation 180°                 | $(x, y) \rightarrow (-x, -y)$       |

Where  
 $k = \frac{\text{New}}{\text{Old}}$

**Standards:** TEKS 8.3(C): Use an algebraic expression to explain the effect of a given positive rational scale factor applied to two-dimensional figures on a coordinate plane with the origin as the center of dilation.

**Players:** 2-6

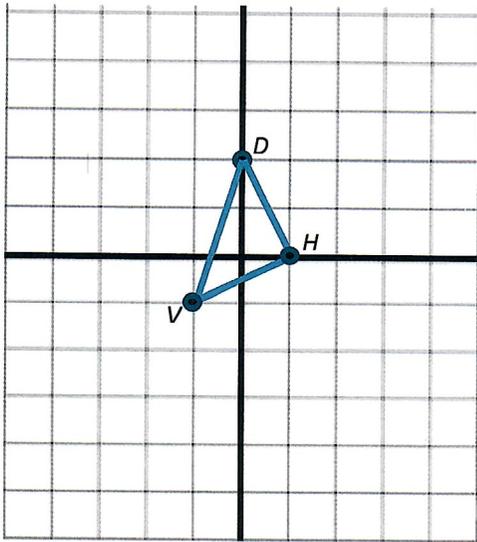
**Materials:**

- \*Geoboard or X/Y Moveable Axis Pegboard, one per person or pair
- \*Rubber bands in 2-3 colors
- \*Set of dilation cards
- \*Paper and pencil for computation
- \*Recording Sheet
- \*Answer Key

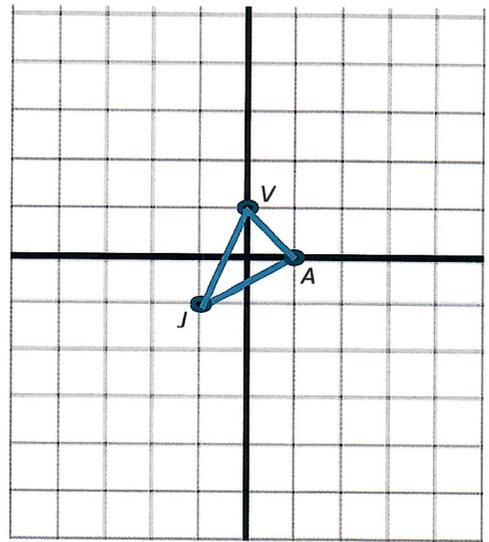
**\*\*\*The OBJECT OF THE GAME is to be the first person or pair to create the new shape on the geoboard based on the dilation\*\*\***

**Directions:**

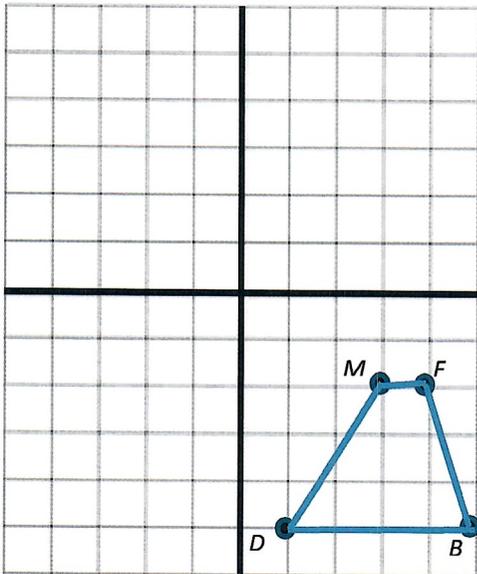
1. Each player or pair is given a geoboard, bands, paper, and pencil
  2. Dilation cards are placed, face down, in the center of all players.
  3. All students place hands on their shoulders and the Leader turns over the top card.
  4. Players or pairs race to see who is first to create the new figure based on the dilation that is on the card. The players use the RECORDING SHEET to determine the points of the new figure.
  5. The Leader or Co-Leader checks the answer key to determine if the figure is correct.
  6. If the answer is correct, the player or pair gets to the card.
  7. All players record the play on the recording sheet.
  8. Play continues with the remaining cards.
  9. The person or pair with the most cards wins the game.
- CHALLENGE:** Create new dilation cards.



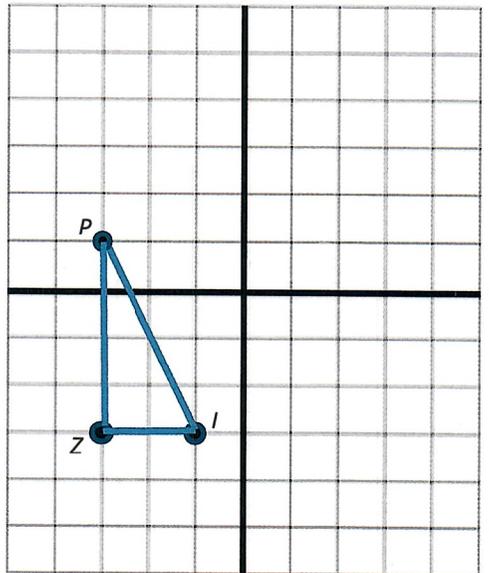
1. DILATION OF 2



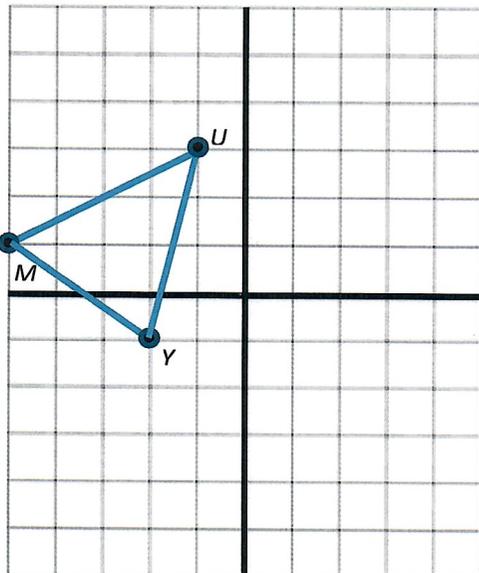
2. DILATION OF 4



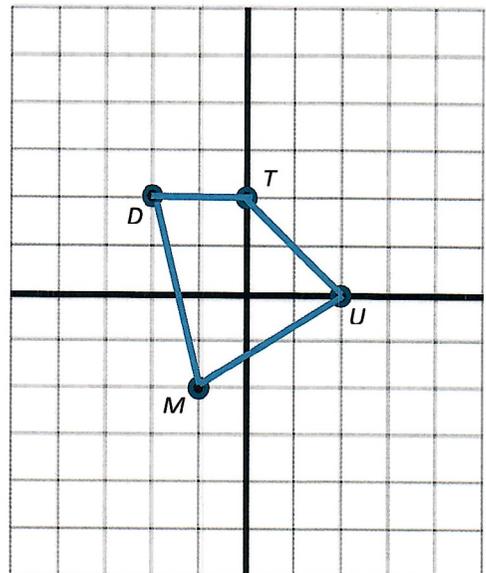
3. DILATION OF  $\frac{1}{2}$



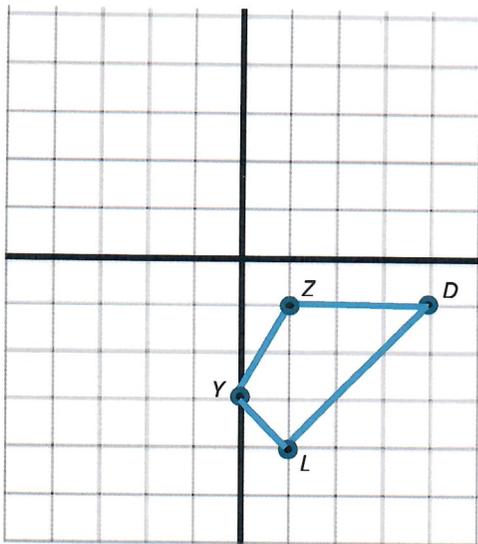
4. DILATION OF 1.5



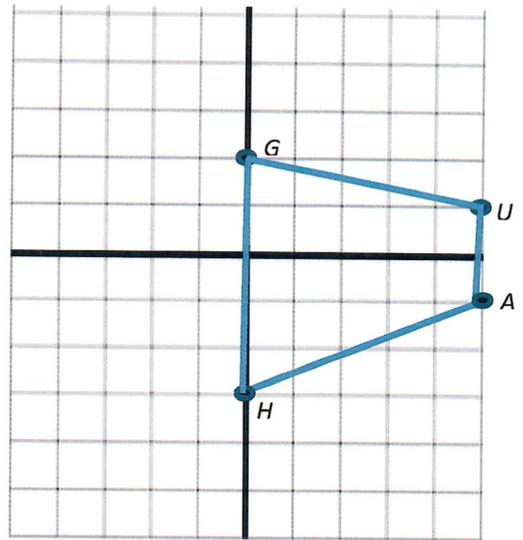
5. DILATION OF  $\frac{1}{2}$



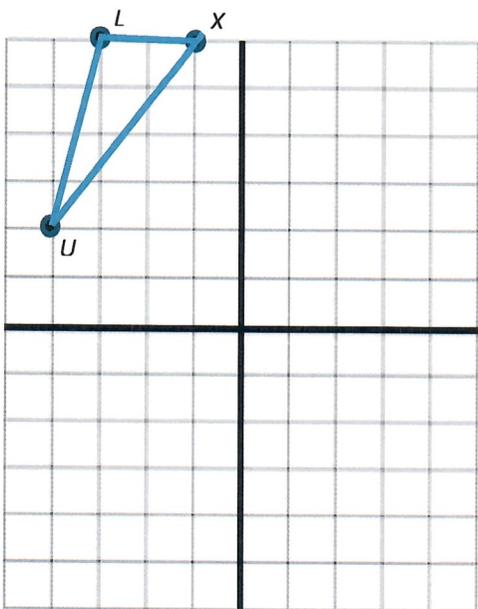
6. DILATION OF 2



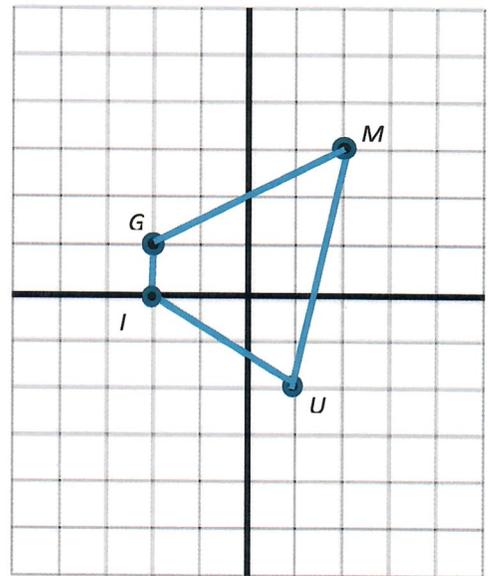
7. DILATION OF .5



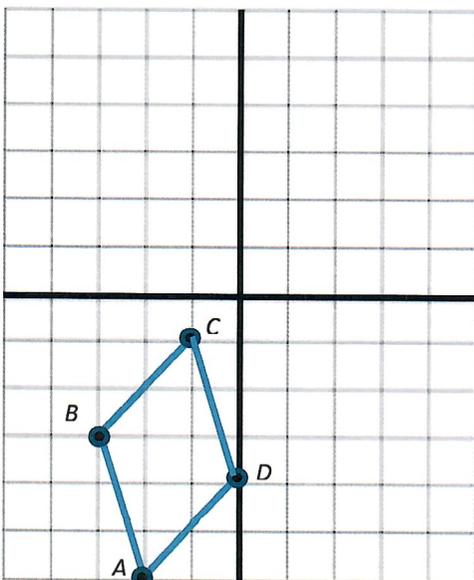
8. DILATION OF .25



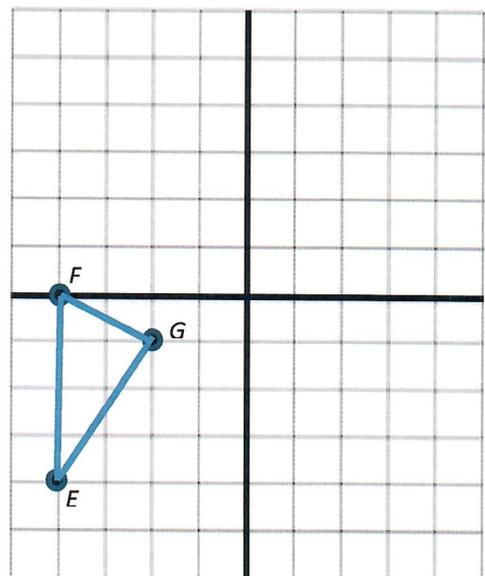
9. DILATION OF  $\frac{1}{2}$



10. DILATION OF 1.5



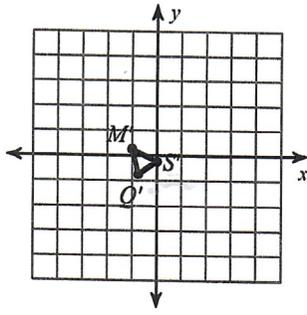
11. DILATION OF  $\frac{1}{2}$



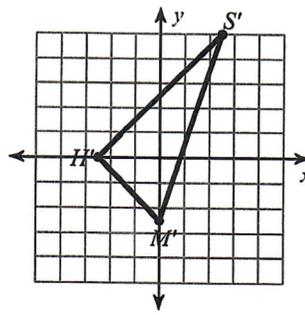
12. DILATION OF .5

# ANSWER KEY

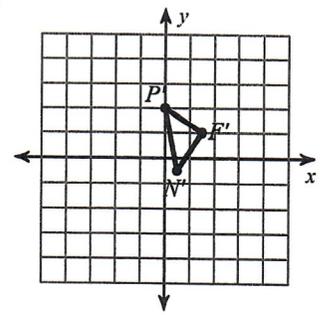
1)



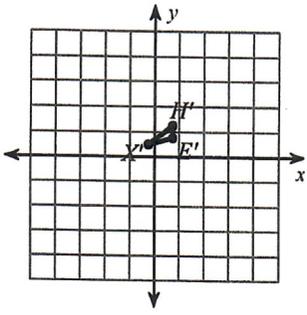
2)



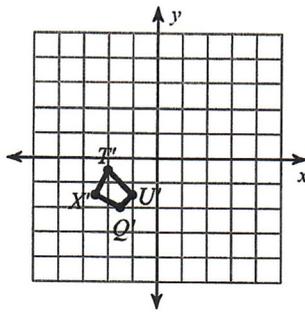
3)



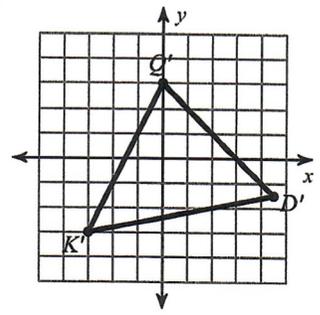
4)



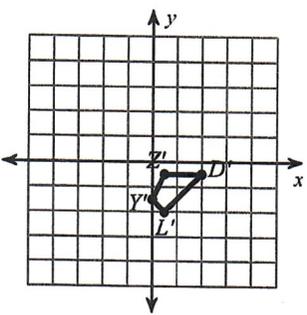
5)



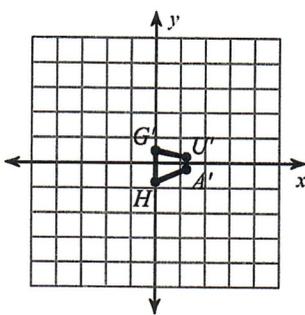
6)



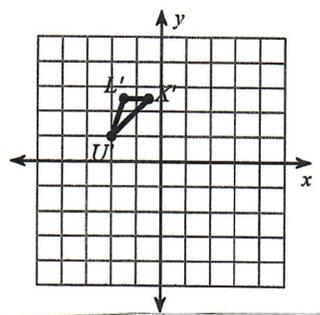
7)



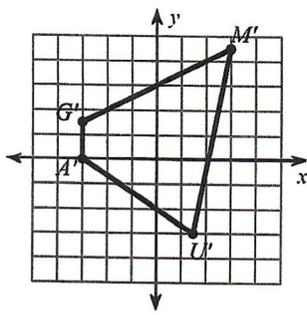
8)



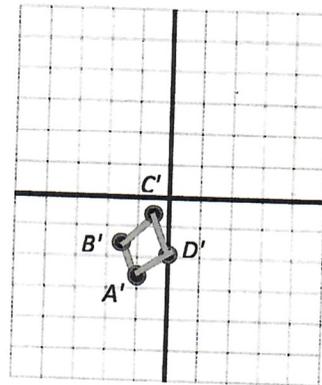
9)



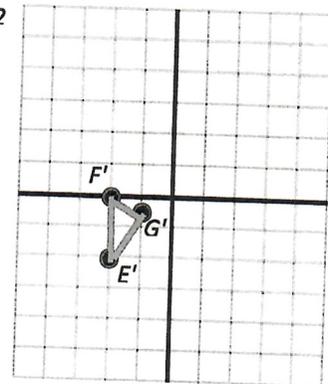
10)



11



12



Names: \_\_\_\_\_ **Geoboard Dilations Game, RECORDING SHEET**

Write the algebraic representation of each dilation. Use the work space to determine the new dilation. Draw the image and the new image created after the dilation.

Algebraic representation of each dilation:

Work Space

Image

New Image

Algebraic representation of each dilation:

Work Space

Image

New Image

Algebraic representation of each dilation:

Work Space

Image

New Image

Algebraic representation of each dilation:

Work Space

Image

New Image

Algebraic representation of each dilation:

Work Space

Image

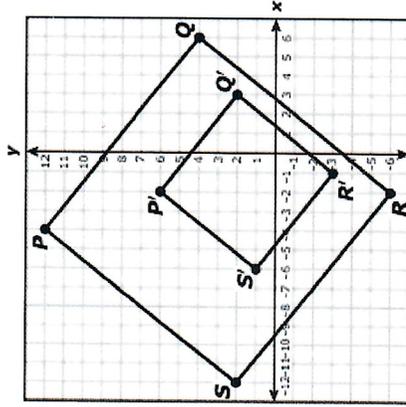
New Image

Name

### Geoboard Dilations Game

Circle the correct solution. Show your work, please.

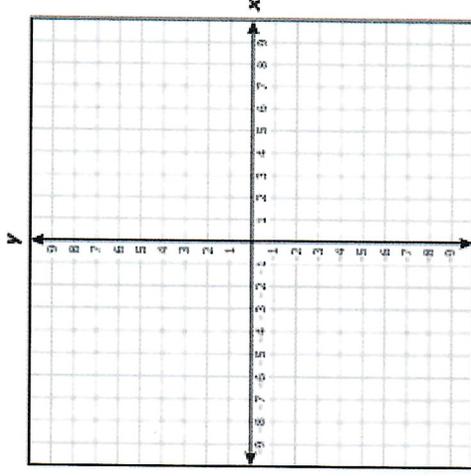
Quadrilateral  $PQRS$  is dilated with the origin as the center of dilation to create quadrilateral  $P'Q'R'S'$ . The coordinates of each vertex are integers.



Which statement is true?

- A Each side length of quadrilateral  $PQRS$  is  $\frac{1}{2}$  the corresponding side length of quadrilateral  $P'Q'R'S'$ .
- B Quadrilateral  $P'Q'R'S'$  is congruent to quadrilateral  $PQRS$ .
- C Each angle measure of quadrilateral  $PQRS$  is  $\frac{1}{2}$  the corresponding angle measure of quadrilateral  $P'Q'R'S'$ .
- D Quadrilateral  $P'Q'R'S'$  is similar to quadrilateral  $PQRS$ .

The coordinates of the vertices of triangle  $XYZ$  are  $X(-2, -1)$ ,  $Y(6, 8)$  and  $Z(8, 4)$ . Triangle  $XYZ$  is dilated by a scale factor of  $\frac{3}{2}$  with the origin as the center of dilation to create triangle  $X'Y'Z'$ .



If  $(x, y)$  represents the location of any point on triangle  $XYZ$ , which ordered pair represents the location of the corresponding point on triangle  $X'Y'Z'$ ?

- A  $(\frac{3}{2}x, \frac{3}{2}y)$
- B  $(x + \frac{3}{2}, y + \frac{3}{2})$
- C  $(\frac{2}{3}x, \frac{2}{3}y)$
- D  $(x + \frac{2}{3}, y + \frac{2}{3})$