Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**STATION 1: LINE DILATIONS**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. A line segment is dilated by a scale factor of 2 centered at a point not on the line segment. Which statement regarding the relationship between the given line segment and its image is true?   |  |  | | --- | --- | | 1) | The line segments are perpendicular, and the image is one-half of the length of the given line segment. | | 2) | The line segments are perpendicular, and the image is twice the length of the given line segment. | | 3) | The line segments are parallel, and the image is twice the length of the given line segment. | | 4) | The line segments are parallel, and the image is one-half of the length of the given line segment. | | 2. A three-inch line segment is dilated by a scale factor of 6 and centered at its midpoint. What is the length of its image?   |  |  | | --- | --- | | 1) | 9 inches | | 2) | 2 inches | | 3) | 15 inches | | 4) | 18 inches | |
| 3. The line  is dilated by a scale factor of  and centered at the origin. Which equation represents the image of the line after the dilation?   |  |  | | --- | --- | | 1) |  | | 2) |  | | 3) |  | | 4) |  | | 4. Line *n* is represented by the equation . Determine and state the equation of line *p*, the image of line *n*, after a dilation of scale factor  centered at the point . [The use of the set of axes below is optional.] Explain your answer. |

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**STATION 2: RIGID MOTIONS**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. What are the coordinates of , the image of , after a rotation of 180º about the origin?   |  |  | | --- | --- | | 1) |  | | 2) |  | | 3) |  | | 4) |  | | 2. If point  is rotated counterclockwise 90° about the origin, its image will be point   |  |  | | --- | --- | | 1) |  | | 2) |  | | 3) |  | | 4) |  | |
| 3. Point  is reflected in the *x*-axis. In which quadrant does its image lie?   |  |  | | --- | --- | | 1) | I | | 2) | II | | 3) | III | | 4) | IV | | 4. On the accompanying set of axes, draw the reflection of *ABCD* in the *y*-axis. Label and state the coordinates of the reflected figure. |
| 5. Triangle *ABC* has vertices , , and . Under a translation, , the image point of *A*, is located at . Under this same translation, point  is located at   |  |  | | --- | --- | | 1) |  | | 2) |  | | 3) |  | | 4) |  | | 6. The image of  under a translation is . Under this translation,  maps onto . Using this translation, the coordinates of image  are . Determine and state the coordinates of point *A*. |

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**STATION 3: DILATIONS**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. Triangle *ABC* has coordinates , , and . On the set of axes below, graph and label , the image of  after a dilation of 2. | 2. The image of  after a dilation of scale factor *k* centered at point *A* is , as shown in the diagram below.    Which statement is always true?   |  |  | | --- | --- | | 1) |  | | 2) |  | | 3) |  | | 4) |  | |
| 3. Under a dilation where the center of dilation is the origin, the image of  is . What are the coordinates of , the image of  under the same dilation?   |  |  | | --- | --- | | 1) |  | | 2) |  | | 3) |  | | 4) |  | | 4. Triangle  is the image of  under a dilation such that . Triangles  and  are   |  |  | | --- | --- | | 1) | congruent but not similar | | 2) | similar but not congruent | | 3) | both congruent and similar | | 4) | neither congruent nor similar | |
| 5. The point maps onto  under a dilation with respect to the origin. What is the scale factor?   |  |  | | --- | --- | | 1) |  | | 2) |  | | 3) | 3 | | 4) |  | | 6. What is the image of point  after a dilation with the center at the origin and a scale factor of 4? |

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**STATION 4: COMPOSITION OF TRANSFORMATIONS**

|  |  |
| --- | --- |
| 1. The image of  under a translation is . Under this translation,  maps onto . Using this translation, the coordinates of image  are . Determine and state the coordinates of point *A*. | 2. The coordinates of , shown on the graph below, are , , and . Graph and label , the image of  after it is reflected over the *y*-axis. Graph and label , the image of  after it is reflected over the *x*-axis. State a single transformation that will map  onto . |
| I 3. In the diagram below,  is a transformation of , and  is a transformation of .    The composite transformation of  to  is an example of a   |  |  | | --- | --- | | 1) | reflection followed by a rotation | | 2) | reflection followed by a translation | | 3) | translation followed by a rotation | | 4) | translation followed by a reflection | | 4. The graph below shows  and its image, .    Describe a sequence of rigid motions which would map  onto . |

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**STATION 5: MAPPING A POLYGON ONTO ITSELF**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. If a pentagon is rotated clockwise around its center, the minimum number of degrees it must be rotated to carry the pentagon onto itself is   |  |  | | --- | --- | | 1) | 54º | | 2) | 72º | | 3) | 108º | | 4) | 360º | | 2. Which regular polygon has a minimum rotation of 45° to carry the polygon onto itself?   |  |  | | --- | --- | | 1) | octagon | | 2) | decagon | | 3) | hexagon | | 4) | pentagon | |
| 3. Which rotation about its center will carry a regular decagon onto itself?   |  |  | | --- | --- | | 1) | 54° | | 2) | 162° | | 3) | 198° | | 4) | 252° | | 4. Which figure always has exactly four lines of reflection that map the figure onto itself?   |  |  | | --- | --- | | 1) | square | | 2) | rectangle | | 3) | regular octagon | | 4) | equilateral triangle | |
| I 5. In the diagram below, a square is graphed in the coordinate plane.    A reflection over which line does *not* carry the square onto itself?   |  |  | | --- | --- | | 1) |  | | 2) |  | | 3) |  | | 4) |  | | 6. A regular hexagon is rotated in a counterclockwise direction about its center. Determine and state the minimum number of degrees in the rotation such that the hexagon will coincide with itself. |