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

CC GEOMETRY TROICI

**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. |

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

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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*. |

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

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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?  |

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

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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 . |

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

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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. |