|  |  |  |  |
| --- | --- | --- | --- |
| Year  8 | | *Transformations and Congruence* | Non Calculator  Test |
| **Skills and Knowledge Assessed:**   * Describe translations, reflections in an axis, and rotations of multiples of 90° on the Cartesian plane using coordinates. Identify line and rotational symmetries (ACMMG181) * Define congruence of plane shapes using transformations (ACMMG200) * Develop the conditions for congruence of triangles (ACMMG201) * Establish properties of quadrilaterals using congruent triangles and angle properties, and solve related numerical problems using reasoning (ACMMG202) | | | Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| *Answer all questions in the spaces provided on this test paper by:*  *Writing the answer in the box provided.*  *or*  *Shading in the bubble for the correct answer from the four choices provided.*  *Show any working out on the test paper. Calculators are* ***not*** *allowed for this section.* | | | |
|  | Use geometric instruments to draw the image after *EFGH* is reflected in the line AB. | | |
|  | How many axes of line symmetry does the shape below have?    axes | | |
|  | Use geometric instruments to draw the image after *PQRS* when it is translated in the distance and direction of the arrow. | | |
|  | What order of rotational symmetry does the shape below have?    2 4 6 8 | | |
|  | Use geometric instruments to draw the image after *ABCD* is rotated through 180o in a clockwise direction about *N*. | | |
|  | The figure *PQR* could be transformed to the figure  by:  Rotation through 180o***.***  Reflection.  Translation.  Rotation through 90o. | | |
|  | The triangle labelled A is reflected in the line XY.    Which triangle could be the image? | | |
|  | Draw all of the axes of line symmetry for the shape shown. | | |
|  | Which shape has rotational symmetry of order 6? | | |
|  | Complete the figure given that *PQ* is an axis of line symmetry. | | |
|  | The point *K* (-5, 3) is reflected in the line  . Which point is the image after the transformation?  A (3, 5)  B (5, -3)  C (3, -5)  D (-3, -5) | | |
|  | Draw the position of the figure *ABC* after a translation in the direction and distance indicated by the arrow. | | |
|  | The point *M* (-6, -4) is rotated through 90o in an anticlockwise direction about the origin.  Which are the coordinates of the image after the transformation?  HHlll | | |
|  | Draw the position of the figure *KLMN* after a rotation through 180o in a clockwise direction about the point *P*( 1, -2) | | |
|  | The point *T* (-4, 8) is translated nine units to the right and twelve units down.  Which point is the image after the transformation?  A (8, 1)  B (5, -4)  C (8, -1)  D (-1, -8) | | |
|  | Figure *ABCD* is moved to an image *A’B’C’D’* by a single transformation.  What was the transformation?  A reflection in the line *y = x*.  A reflection in the line *y = -x*  An anticlockwise rotation of 90o about the origin.  A clockwise rotation of 90o about the origin. | | |
|  | The triangle *ABC* is reflected in the line segment *XY*, to give the triangle *EFG*.  Which is not a pair of congruent triangles? | | |
|  | Figure *UVWX*  is moved to an image *U’V’W’X’* by a single transformation.  What was the transformation?  A reflection in the *x* axis  A reflection in the *y* axis.  A rotation of 180o about the origin.  A translation downward along the *y* axis.. | | |
|  | This geometric pattern was created by transforming congruent polygons.  Which statement is **not** true?  All of the polygons in the pattern are congruent.  All of the octagons in the pattern are congruent.  The pattern has line symmetry.  The pattern has rotational symmetry. | | |
|  | A parallelogram *ABCD* has both its diagonals drawn, intersecting at *E*.    Which statement is true? | | |
|  | *PQR* is reflected in the *x* axis and then translated to the right.  Which figure is its image?  Triangle A  Triangle B  Triangle C  Triangle D | | |
|  | The point P (-5, 4) is reflected in the line *y* = *x* and then rotated in an anticlockwise direction about the origin.  Which point is the image after these two transformations?    A (4, 5).  B (4, -5).  C (-5, -4).  D (-4, 5). | | |
|  | Which of the congruence tests could be used to show that    AAS RHS SAS SSS | | |
|  | The point A (3, 5) is reflected in the line *y* = -*x* and then translated 10 units to the right and 6 units upward.  Give the coordinates of the point which is the image after these transformations?  ( , ) ) | | |
|  | In the figure below, *PQ* = *SR*.  Which single additional piece of information would allow you to show that    = | | |
|  | *QP* || *SR* and *QP* = *SR*.  Which of the congruence tests could be used to show that  AAS  RHS  SAS  SSS | | |
|  | The point *M* (5, 2) is rotated about the origin through 90o in an anticlockwise direction. What single reflection would then move the image to *N*(5, -2)?  ) | | |
|  | Which of the congruence tests could be used to show that .    AAS RHS SAS SSS | | |
|  | The polygon *UVW* is rotated about the origin through 180o in a clockwise direction and then translated 8 units to the right. Draw the image *U’V’W’* after these two transformations. | | |
|  | *RX = SX*, and *X* is the midpoint of *PQ*.  Which of the congruence tests could be used to show that    AAS RHS SAS SSS | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Year  8 | | *Transformations and Congruence* | Longer Answer  Section | |
|  | | | Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| *Show all working, diagrams and answers in the spaces provided on this test paper.*  *Answers should be supported by relevant mathematical reasoning and/or calculations.*  *Marks allocated are shown beside each question.* | | | | |
|  | | | | **Marks** |
| 1. | (a) Complete the diagram below so that the figure has two axes of line symmetry. | | | **2** |
|  | (b) Complete the diagram below so that the figure has rotational symmetry of order 3  . | | | **2** |
| 2. | (a) Draw a figure congruent to *ABCD*, by reflecting in the line *y = x*. | | | **2** |
|  | (b)  Describe a single transformation that could move *EFGH* to its image *E’F’G’H’*.  ……………………………………………………………………………………..  …………………………………………………………………………………….. | | | **1** |
| 3. | (a) Using the information provided on the diagram below, prove that      ……………………………………………………………………………………..  ……………………………………………………………………………………..  ……………………………………………………………………………………..  ……………………………………………………………………………………..  …………………………………………………………………………………….. | | | **3** |
|  | (b) In the figure below,  and  Prove that    ……………………………………………………………………………………..  ……………………………………………………………………………………..  ……………………………………………………………………………………..  ……………………………………………………………………………………..  ……………………………………………………………………………………..  …………………………………………………………………………………….. | | | **3** |

*Transformations and Congruence*

ANSWERS

|  |
| --- |
| Non Calculator Section ( 1 mark each) |

|  |  |
| --- | --- |
|  | Working and Answers |
|  | Use geometric instruments to draw the image after *EFGH* is reflected in the line AB. |
|  | How many axes of line symmetry does the shape below have?    2 axes |
|  | Use geometric instruments to draw the image after *PQRS* when it is translated in the distance and direction of the arrow. |
|  | What order of rotational symmetry does the shape below have?    2 4 6 8 |
|  | Use geometric instruments to draw the image after *ABCD* is rotated through 180o in a clockwise direction about *N*. |
|  | The figure *PQR* could be transformed to the figure  by:  Rotation through 180o***.***  Reflection.  Translation.  Rotation through 90o. |
|  | The triangle labelled A is reflected in the line XY.    Which triangle could be the image? |
|  | Draw any axes of line symmetry for the shape shown. |
|  | Which shape has rotational symmetry of order 6? |
|  | Complete the figure given that *PQ* is an axis of line symmetry. |
|  | The point *K* (-5, 3) is reflected in the line  . Which point is the image after the transformation?  A (3, 5)  B (5, -3)  C (3, -5)  D (-3, -5) |
|  | Draw the position of the figure *ABC* after a translation in the direction and distance indicated by the arrow. |
|  | The point *M* (-6, -4) is rotated through 90o in an anticlockwise direction about the origin.  Which are the coordinates of the image after the transformation?  (4, -6) |
|  | Draw the position of the figure *KLMN* after a rotation through 180o in a clockwise direction about the point *P*( 1, -2) |
|  | The point *T* (-4, 8) is translated nine units to the right and twelve units down.  Which point is the image after the transformation?  A (8, 1)  B (5, -4)  C (8, -1)  D (-1, -8) |
|  | Figure *ABCD* is moved to an image *A’B’C’D’* by a single transformation.  What was the transformation?  A reflection in the line *y = x*.  A reflection in the line *y = -x*  An anticlockwise rotation of 90o about the origin.  A clockwise rotation of 90o about the origin. |
|  | The triangle *ABC* is reflected in the line segment *XY*, to give the triangle *EFG*.  Which is **not** a pair of congruent triangles? |
|  | Figure *UVWX*  is moved to an image *U’V’W’X’* by a single transformation.  What was the transformation?  A reflection in the *x* axis.  A reflection in the *y* axis.  A rotation of 180o about the origin.  A translation downward along the *y* axis..    It is flipped over, hence a reflection. |
|  | This geometric pattern was created by transforming congruent polygons.  Which statement is **not** true?  All of the polygons in the pattern are congruent.  All of the octagons in the pattern are congruent.  The pattern has line symmetry.  The pattern has rotational symmetry.  (Since there are squares and octagons,  not all are congruent) |
|  | A parallelogram *ABCD* has both its diagonals drawn, intersecting at *E*.    Which statement is true?          Can use AAS to show congruence. |
|  | *PQR* is reflected in the *x* axis and then translated to the right.  Which figure is its image?  Triangle A  Triangle B  Triangle C  Triangle D  Reflection gives D then translation gives B. |
|  | The point P (-5, 4) is reflected in the line *y* = *x* and then rotated 180o in an anticlockwise direction about the origin.  Which point is the image after these two transformations?    A (4, 5).  B (4, -5).  C (-5, -4).  D (-4, 5). |
|  | Which of the congruence tests could be used to show that    Use the right angle  the 33o angle and  the common side  for AAS.  AAS RHS SAS SSS |
|  | The point A (3, 5) is reflected in the line *y* = -*x* and then translated 10 units to the right and 6 units upward.  Give the coordinates of the point which is the image after these transformations?     |  | | --- | | ( 5 , 3 ) | |
|  | In the figure below, *PQ* = *SR*.  Which single additional piece of information would allow you to show that    PR is a common side.  QR  PS  = would give SSS.      = would give SAS. |
|  | *QP* || *SR* and *QP* = *SR*.  Which of the congruence tests could be used to show that  AAS  RHS  SAS  SSS |
|  | The point *M* (5, 2) is rotated about the origin through 90o in an anticlockwise direction. What single reflection would then move the image to *N*(5, -2)?  A reflection in the line *y = x*. |
|  | Which of the congruence tests could be used to show that .    Using the common  side BC.  AAS RHS SAS SSS |
|  | The polygon *UVW* is rotated about the origin through 180o in a clockwise direction and then translated 8 units to the right. Draw the image *U’V’W’* after these two transformations. |
|  | *RX = SX*, and *X* is the midpoint of *PQ*.  Which of the congruence tests could be used to show that    AAS RHS SAS SSS |

|  |
| --- |
| Longer Answer Section |

|  |  |  |
| --- | --- | --- |
| 1. | (a) Complete the diagram below so that the figure has two axes of line symmetry.    Others are possible. | **2** |
|  | (b) Complete the diagram below so that the figure has rotational symmetry of order 3  . | **2** |
| 2. | (a) Draw a figure congruent to *ABCD*, by reflecting in the line *y = x*. | **2** |
|  | (b)  Describe a single transformation that could move *EFGH* to its image *E’F’G’H’*.  A reflection in the line *y = -x.* | **1** |
| 3. | (a) Using the information provided on the diagram below, prove that | **3** |
|  | (b) In the figure below,  and  Prove that | **3** |