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| Year 10 | | *Congruence* | Non Calculator |
| **Skills and Knowledge Assessed:**   * Define congruence of plane shapes using transformations (ACMMG200) * Develop the conditions for congruence of triangles (ACMMG201) * Formulate proofs involving congruent triangles and angle properties (ACMMG243) | | | Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Section 1** Short Answer Section | | | |
| Write all working and answers in the spaces provided on this test paper.  YOU WILL NEED A RULER, COMPASSES AND PROTRACTOR. | | | |
|  | Use the grid to draw a shape which is congruent to the one shown. | | |
|  | Reflect the trapezium in the line *XY*.  Draw the trapezium in its new position. | | |
|  | Rotate the quadrilateral through 60° about C in an anticlockwise direction.    Draw the quadrilateral in its new position. | | |
|  | Translate the shape in the distance and direction of the arrow.    Draw the shape in its new position. | | |
|  | Which two trapeziums are congruent? (Write their letters in the space below.)    ………………………………………………… | | |
|  | **AAS** is an abbreviation for one of the tests for congruent triangles. It says:  Two triangles are congruent if two angles and a side of one triangle are equal to two angles and a corresponding side of the other.  What does the test which is abbreviated as **SAS** say?  ……………………………………………………………………………………………....  ………………………………………………………………………………………………. | | |
|  | Which of the congruence test (AAS, RHS, SAS or SSS) could be used to show congruence of triangles *GHI* and *JKL*?  ................................................................... | | |
|  | A kite *ABCD* has a diagonal drawn.  Which of the congruence test (AAS, RHS, SAS or SSS) could be used to show that :  …………………………………………. | | |
|  | What additional piece of information would need to be given about  in order to prove that  ………………………………………  ………………………………………. | | |
|  | Which two triangles below have enough information provided to show they are congruent to one another.  Explain your answer.  ……………………………………………………………………………………………....  ………………………………………………………………………………………………. | | |
|  | In the figure below, *BC* = *EF.*  .  Give one additional piece of information would allow you to show that and which congruence test would be used?  ………………………………………………  ………………………………………………. | | |
|  | The diagram at right is drawn on isometric grid paper.  It shows a regular hexagon which has been divided into a number of triangles.  Which pair of triangles are congruent and which test could be used to prove this?  ………………………………………………  …………………………………………….... | | |
|  | UW = XY, UV = XZ and  .  A proof that  has been started.      Complete the last two lines of the proof.  ………………………………………………  …………………………………………….... | | |
|  | Complete the proof below, by writing in the reasons for each step.  Show that | | |
|  | In the diagram below, *DE* = *GE*, *DF* is a straight line segment and  Complete the proof below, by filling in the missing information.    Prove that | | |

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| Year 10 | | *Congruence* | Calculator Allowed |
| Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Section 2** Multiple Choice Section | | | |
| Mark all your answers on the accompanying multiple choice answer sheet, not on this test paper. You may do any working out on this test paper. Calculators are allowed for this section.  YOU WILL NEED A RULER, COMPASSES AND PROTRACTOR. | | | |
|  | Which of the pairs of triangles listed below are congruent?    A. *K* and *F* B. *K* and *J* C. *K* and *I* D. *K* and *G* | | |
|  | How many congruent triangles are there in the shape below?  A. 4  B. 6  C. 12  D. 18 | | |
|  | What transformation could have been used to produce the congruent image  A. Reflection.  B. Rotation through 90o.  C. Rotation through 180o.  D. Translation. | | |
|  | The triangle *OPQ* is reflected in the interval *OQ*.    Which triangle could be the image?     1. B. C. D. | | |
|  | Triangle A has the measurements shown at right.  Which of the triangles below is congruent to Triangle A?  The diagrams are not to scale.  A. B. C. D. | | |
|  | Which shape is congruent to shape X?  A. Shape A  B. Shape B  C. Shape C  D. Shape D | | |
|  | Which triangles are congruent?    A. All three triangles.  B. Triangles 1 and 2.  C. Triangles 1 and 3.  D. Triangles 2 and 3. | | |
|  | Figure *ABCD* is moved to an image  by a single transformation.  What was the transformation?  A. A clockwise rotation of 180o about the origin.  B. A clockwise rotation of 90o about the origin.  C. A reflection in the line *y = x*.  D. A reflection in the line *y = -x* | | |
|  | The rhombus *WXYZ* is reflected in the line segment *AB*, to give the rhombus *EFGH*.  Which is **not** a pair of congruent triangles?  A.  B.  C.  D. | | |
|  | Which of the congruence tests is sufficient to prove that  ?    A. AAS B. RHS C. SAS D. SSS | | |
|  | Which triangle is congruent to  ?    A.  B. C. D. | | |
|  | The circles shown are concentric with centre *O*.  MP and NQ are diameters of the larger and smaller circles respectively.  Which of the congruence tests is sufficient to prove that  ?  A. AAS B. RHS  C. SAS D. SSS | | |
|  | *QR* = *SR* and *R* bisects *PT*.  Which of the congruence tests could be used to show that  ?  A. AAS  B. RHS  C. SAS  D. SSS | | |
|  | In the figure below, *BC* = *EF.*  .  Which single additional piece of information would allow you to show that    A.  B.  C. *BA* = *ED* D. CA = FD | | |
|  | In , *D* bisects *AC*.    In the proof that  a reason has been left out indicated by \*\*\*\*\*\*\*    Which reason should go in the spot?  A. Alternate angles on parallel lines.  B. Base angles of isosceles triangle.  C. Right angles on a straight line.  D. Vertically opposite angles. | | |

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| Year 10 | *Congruence* | Calculator Allowed |
| Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Section 3** Longer Answer Section | | |
| Write all working and answers in the spaces provided on this test paper.  YOU WILL NEED A RULER, COMPASSES AND PROTRACTOR. | | |

|  | | **Marks** |
| --- | --- | --- |
| 1. | (a) Reflect the polygon *JKLMN* in the line *OP*. | **2** |
|  | (b) Label the image after reflections as *J’K’L’M’N’*. | **1** |
|  | (c) What could you say about  ?  ……………………………………………………………………………………..  …………………………………………………………………………………….. | **1** |
| 2. | Draw the image of the shape below when it is rotated through 180o about the point C. | **2** |
| 3. | (a) A triangle has two sides whose lengths are given below and has an angle of 40o between these two sides. Use instruments to accurately draw the triangle. | **2** |
|  | (b) A triangle has a base which measures 8 cm, with an angles of 30o and 50o at the ends of the base. Use instruments to accurately draw the triangle. | **2** |
| 4. | (a) Prove that    ………………………………………………………………………………………………………………………………………………….  …………………………………………………………………………………………………………………………………………………  …………………………………………………………………………………………………………………………………………………  ………………………………………………………………………………………………………………………………………………….  …………………………………………………………………………………………………………………………………………………  ………………………………………………………………………………………………………………………………………………… | **2** |
|  | (b) Prove that    …………………………………………………………………………………………………………………………………………………  …………………………………………………………………………………………………………………………………………………  ………………………………………………………………………………………………………………………………………………….  …………………………………………………………………………………………………………………………………………………  ………………………………………………………………………………………………………………………………………………… | **2** |
|  | (c) In the quadrilateral *GHIJ,* the diagonals are equal in lengthand *GJ = HI.*  Prove that    ………………………………………………………………………………………………………………………………………………….  …………………………………………………………………………………………………………………………………………………  …………………………………………………………………………………………………………………………………………………  ………………………………………………………………………………………………………………………………………………….  ………………………………………………………………………………………………………………………………………………… | **2** |

*Multiple Choice Answer Sheet*

*Congruence*

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Completely fill the response oval representing the most correct answer.

1. A B C D

2. A B C D

3. A B C D

4. A B C D

5. A B C D

6. A B C D

7. A B C D

8. A B C D

9. A B C D

10. A B C D

11. A B C D

12. A B C D

13. A B C D

14. A B C D

15. A B C D

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| Year 10 | | *Congruence* | Non Calculator |
| **Section 1** Short Answer Section | | | |
| ANSWERS | | | |
| No. | WORKING | | ANSWER |
|  |  | | Solution is the darker shaded shape on the diagram; can be in any position. |
|  |  | | Solution is the darker shaded shape on the diagram; must be in the position shown. |
|  |  | | Solution is the darker shaded shape on the diagram; must be in the position shown. |
|  |  | | Solution is the darker shaded shape on the diagram; must be in the position shown. |
|  |  | | F and K |
|  | SAS says that two triangles are congruent if two sides and an included angle of one triangle are equal to two sides and an included angle of the other. | | Statement shown |
|  | There are two sides and an included angle equal. (SAS) | | SAS |
|  | As AC is common and 2 sides are given, SSS could be used. | | SSS |
|  | To use AAS, you would need that | |  |
|  |  | | See explanation |
|  | AC = FD would allow use of SAS.  AB = DE would allow use of RHS.  would allow use of AAS.  would allow use of AAS. | | Any one of the 4 choices given at left is correct. |
|  | Triangles G and J are congruent and since there is grid behind, we can use SSS, AAS or SAS to prove congruence. | | Triangles G and J are congruent using SSS, AAS or SAS. |
|  |  | | provide the two lines |
|  |  | | Bold reasons are needed. |
|  |  | | Bold lines are needed |

|  |  |  |  |  |
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| Year 10 | | *Congruence* | Calculator Allowed | |
| **Section 2** Multiple Choice Section | | | | |
| ANSWERS | | | | |
| No. | WORKING | | | ANSWER |
|  | The only triangle congruent to K is G. | | | D |
|  | There are 12 | | | C |
|  | Translation | | | D |
|  | A is a reflection in the line OQ | | | A |
|  | B is congruent through AAS. | | | B |
|  | C is congruent to X | | | C |
|  | Triangles 1 and 2 are congruent SAS. | | | B |
|  | A clockwise rotation of 180o about the origin. | | | A |
|  | are not congruent | | | D |
|  | AAS using the 60 cm side and the angles 101o and 42o. | | | A |
|  | A is congruent to the given triangle using SAS. | | | A |
|  | Using the equal radii of the larger and smaller circels and the vertically opposite angles we can show congruence using SAS. | | | C |
|  | Can use RHS with angles P and T as the right angles,  PR = RT as equal sides, and QR = SR as equal hypotenuses. | | | B |
|  | together with the right angles and equal sides allows AAS. | | | B |
|  | , because right angles on a straight line are equal. | | | C |

*Multiple Choice Answer Sheet*

*Congruence*

Name \_\_\_\_\_\_\_ANSWERS\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Completely fill the response oval representing the most correct answer.

1. A B C D

2. A B C D

3. A B C D

4. A B C D

5. A B C D

6. A B C D

7. A B C D

8. A B C D

9. A B C D

10. A B C D

11. A B C D

12. A B C D

13. A B C D

14. A B C D

15. A B C D

|  |  |  |  |  |
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| Year 10 | | *Congruence* | Calculator Allowed | |
| **Section 3** Longer Answer Section | | | | |
| ANSWERS | | | | |
|  | | | | **Marks** |
| 1. | (a) | | | **2** |
|  | (b) Labels on the image above. | | | **1** |
|  | (c) | | | **1** |
| 2. | (a) | | |  |
| 3. | (a) | | | **2** |
|  | (b) | | | **2** |
| 4. | (a) | | | **2** |
|  | (b) | | | **2** |
|  | (c) | | | **2** |