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| Year  10 | *Geometric Reasoning* | Calculator Allowed |
| **Skills and Knowledge Assessed:**   * Apply logical reasoning, including the use of congruence and similarity, to proofs and numerical exercises involving plane shapes (ACMMG244) * Formulate proofs involving congruent triangles and angle properties (ACMMG243) | | Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Extended/Connected Answer Test. | | |
| Give reasons for all steps when finding unknown values and proving properties.  Write all working and answers in the spaces provided on this test paper.  Diagrams are not to scale unless otherwise stated. | | |

|  | | **Marks** |
| --- | --- | --- |
| 1. | Find the value of the pronumeral in each of the following diagrams.  Show step by step reasoning to explain your answer. |  |
| a) | ………………………………………………  ……………………………………………….  ………………………………………………  ………………………………………………. | **2** |
| b) | ………………………………………………  ……………………………………………….  ………………………………………………  ………………………………………………. | **2** |
| c) | ………………………………………………  ……………………………………………….  ………………………………………………  ………………………………………………. | **3** |
| 2. a) | Prove that  ………………………………………………  ……………………………………………….  ………………………………………………  ………………………………………………. | **3** |
| b) | ………………………………………………  ……………………………………………….  ………………………………………………  ………………………………………………. | **3** |
| 3. a) | Prove that  ………………………………………………  ……………………………………………….  ………………………………………………  ………………………………………………. | **3** |
| b) | i) Given the dimensions shown, prove that  ………………………………………………  ……………………………………………….  ………………………………………………  ……………………………………………….  ………………………………………………. | **3** |
|  | ii) Find the value of *x*.  ……………………………………………………………………………………………….  ……………………………………………………………………………………………….  ………………………………………………………………………………………………. | **1** |
| 4. a) | ………………………………………………  ………………………………………………  ……………………………………………….  ………………………………………………  ……………………………………………….  ………………………………………………  ………………………………………………. | **3** |
| b) | *O* is the centre of both circles.  *A* and *D* are points on the larger circle.  *B* and *C* are points on the smaller circle.  Use congruent triangles to prove that *AB* = *CD*.  ………………………………………………  ……………………………………………….  ………………………………………………  ……………………………………………….  ……………………………………………… | **4** |
| c) | Prove that the triangle *MNO* is isosceles.  ………………………………………………  ……………………………………………….  ……………………………………………….  ………………………………………………  ………………………………………………. | **4** |

*Geometric Reasoning*

ANSWERS

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| 1.  a) |  | 1 mark for sum  1 for value of pronumeral with reason |
| b) |  | 1 mark for each pronumeral with reason |
| c) |  | 1 mark for each step with reasons (or equivalent) |
| 2  a) |  | 3 marks for correct & complete proof.  2 if a reason or statement is incorrect or missing  1 if one correct statement is made toward proof. |
| b) |  | 3 marks for correct & complete proof.  2 if a reason or statement is incorrect or missing  1 if one correct statement is made toward proof. |
| 3 a) |  | 3 marks for correct & complete proof.  2 if a reason or statement is incorrect or missing  1 if one correct statement is made toward proof. |
| b) | i) | 3 marks for correct & complete proof.  2 if a reason or statement is incorrect or missing  1 if one correct statement is made toward proof. |
|  | ii) | 1 for correct answer |
| 4 a) |  | 3 marks for correct & complete proof.  2 if a reason or statement is incorrect or missing  1 if one correct statement is made toward proof. |
| b) |  | 3 marks for correct & complete CONGRUENCE proof.  2 if a reason or statement is incorrect or missing  1 if one correct statement is made toward proof.  1 mark for deduction of result from the congruence. |
| c) |  | 1 mark for the Pythagoras proof  2 marks for correct congruence proof, or 1 mark for partially correct congruence.  1 mark for deduction of required result following from congruence. |