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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 Answer Test.** | | |
| Answers should be supported by relevant mathematical reasoning and/or calculations  **Marks will not be awarded for answers with no reasoning.**  Complete any diagrams and write all working and answers in the spaces provided on this test paper. | | |

|  | | **Marks** |
| --- | --- | --- |
| 1. | (a) Find the value of *k*.  …………………………………………  ………………………………………….  …………………………………………  ..………………………………………. | **2** |
|  | (b) Find the value of *b*.  …………………………………………  ………………………………………….  …………………………………………  ..………………………………………. | **2** |
|  | (c) Find the value of *m*.  ……………………………………………  ….………………………………………..  ……………………………………………  ……..…………………………………….. | **2** |
|  |  |  |
| 2. | (a) Find the value of *g*.  ……………………………………………  ….………………………………………..  ……………………………………………  ……..…………………………………….. | **2** |
|  | (b) Find the value of *p*.  …………………………………………  ………………………………………….  …………………………………………  ..………………………………………. | **2** |
|  | (c) Find the value of *w*.  …………………………………………  ………………………………………….  …………………………………………  ..………………………………………. | **3** |
| 3. | (a) *KL, MN* and *QR* are straight lines which intersect at *P*.  Find the value of *x*.  …………………………………………  ………………………………………….  …………………………………………  ..………………………………………. | **3** |
|  | (b) Find the value of *d*.  ………………………………………………  ……………………………………………….  ………………………………………………  ………………………………………………. | **3** |
|  | (c) Find the value of  ………………………………………………  ……………………………………………….  ………………………………………………  ………………………………………………. | **3** |
| 4. | (a) AC || DF.  Find the value of *g*.  ……………………………………………....  ……………………………………………....  ………………………………………………  ………………………………………………. | **3** |
|  | (b) ABCD is a rectangle. F is a point on BC.  Find the size of    ………………………………………………  ………………………………………………  ……………………………………………....  ………………………………………………  ………………………………………………. | **3** |
|  | (c) PQR is an isosceles triangle. PR is produced to S.  Find the value of *q*.  ………………………………………………  ……………………………………………….  ………………………………………………  ………………………………………………. | **3** |
| 5. | (a)  ……………………………………………………………………………………  ……………………………………………....……………………………………  ……………………………………………………………………………………  ……………………………………………….…………………………………… | **3** |
|  | (b)        ……………………………………………………………………………………  ……………………………………………....……………………………………  ……………………………………………………………………………………  ……………………………………………….…………………………………… | **3** |
|  | (c) TS and RP are straight line segments which bisect one another at right angles at Q.  Prove that    ……………………………………………………………………………………..  ……………………………………………………………………………………..  ……………………………………………………………………………………..  ……………………………………………………………………………………..  …………………………………………………………………………………….. | **3** |
| 6. | (a) Using only the property that *two pairs of adjacent sides of the kite ABCD are equal*, prove the property that the diagonal AC bisects the angle BAD.    ……………………………………………………………………………………  ……………………………………………....……………………………………  ……………………………………………………………………………………  ……………………………………………….…………………………………… | **3** |
|  | (b) IH || KL, IH = 4.5 cm, KL = 12 cm and JK = 8 cm.    (i)    ……………………………………………………………………………………  ……………………………………………....……………………………………  ……………………………………………………………………………………  (ii) Find the length of HJ.  ……………………………………………….……………………………………  ……………………………………………….…………………………………… | **3**  **2** |
|  | (c) A, B C and D are three points on a circle centre O, such that BD is a diameter.    (i) Prove that  =  ….……………………………………………  …….…………………………………………  ……….………………………………………  ………….……………………………………  …………….………………………….………  (ii) Prove that  =  ………….……………………………………  …….…………………………………………  ……….……………………………………… | **2**    **2** |

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| Year 10 | | *Geometric Reasoning* | Calculator Allowed | |
| **Extended Answer Test.** | | | | |
| ANSWERS | | | | |
|  | | | | **Marks** |
| 1. | (a) | | | **2 marks for correct answer with reason.**  **1 mark if answer or reason is wrong or not provided.** |
|  | (b) | | | **2 marks for correct answer with reason.**  **1 mark if answer or reason is wrong or not provided.** |
|  | (c) | | | **2 marks for correct answer with reason.**  **1 mark if answer or reason is wrong or not provided.** |
| 2. | (a) | | | **2 marks for correct answer with reason.**  **1 mark if answer or reason is wrong or not provided.** |
|  | (b) | | | **2 marks for correct answer with reason.**  **1 mark if answer or reason is wrong or not provided** |
|  | (c) | | | **2 marks for correct answer with reasons.**  **1 mark if answer is calculated incorrectly or one line of reasoning is wrong or not provided** |
| 3. | (a) | | | **3 marks for correct answer with all reasons.**  **2 marks if answer is calculated incorrectly or one line of reasoning is wrong or not provided**  **1 mark if answer is calculated incorrectly and one line of reasoning is wrong or more than one line of reasoning is wrong or not provided** |
|  | (b) | | | **3 marks for correct answer with all reasons.**  **2 marks if answer is calculated incorrectly or one line of reasoning is wrong or not provided**  **1 mark if answer is calculated incorrectly and one line of reasoning is wrong or more than one line of reasoning is wrong or not provided** |
|  | (c) | | | **3 marks for correct answer with all reasons.**  **2 marks if answer is calculated incorrectly or one line of reasoning is wrong or not provided**  **1 mark if answer is calculated incorrectly and one line of reasoning is wrong or more than one line of reasoning is wrong or not provided** |
| 4. | (a) | | | **3 marks for correct answer with all reasons.**  **2 marks if answer is calculated incorrectly or one line of reasoning is wrong or not provided**  **1 mark if answer is calculated incorrectly and one line of reasoning is wrong or more than one line of reasoning is wrong or not provided** |
|  | (b) | | | **3 marks for correct answer with all reasons.**  **2 marks if answer is calculated incorrectly or one line of reasoning is wrong or not provided**  **1 mark if answer is calculated incorrectly and one line of reasoning is wrong or more than one line of reasoning is wrong or not provided** |
|  | (c) | | | **3 marks for correct answer with all reasons.**  **2 marks if answer is calculated incorrectly or one line of reasoning is wrong or not provided**  **1 mark if answer is calculated incorrectly and one line of reasoning is wrong or more than one line of reasoning is wrong or not provided** |
| 5. | (a) | | | **3 marks for correct conclusion with right congruence test and all steps of reasoning given.**  **2 marks for correct conclusion with one step of reasoning incorrect or not provided or if conclusion uses wrong test**  **1 mark if at least one correct statement needed for the proof is provided** |
|  | (b) | | | **3 marks for correct answer with all reasons.**  **2 marks if answer is calculated incorrectly or one line of reasoning is wrong or not provided**  **1 mark if answer is calculated incorrectly and one line of reasoning is wrong or more than one line of reasoning is wrong or not provided** |
|  | (c) | | | **3 marks for correct conclusion with right congruence test and all steps of reasoning given.**  **2 marks for correct conclusion with one step of reasoning incorrect or not provided or if conclusion uses wrong test**  **1 mark if at least one correct statement needed for the proof is provided** |
| 6. | (a) Adjacent sides are equal. | | | **3 marks for correct conclusion with right congruence test and all steps of reasoning given, including the bisection of angle.**  **2 marks for correct conclusion with one step of reasoning incorrect or not provided or if congruence uses wrong test or conclusion is incorrect or not provided**  **1 mark if at least two correct statements needed for the proof are provided** |
|  | (b)  (i)    (ii) | | | **(i)**  **3 marks for correct conclusion with right similarity test and all steps of reasoning given.**  **2 marks for correct conclusion with one step of reasoning incorrect or not provided or if congruence uses wrong test or conclusion is incorrect or not provided**  **1 mark if at least two correct statements needed for the proof are provided**  **(ii)**  **2 marks if answer is calculated correctly with reasoning/working provided**  **1 mark if answer is calculated incorrectly with some correct working/reasoning** |
|  | (c)  (i)    =  (ii)  = | | | **(i) 2 marks for correct conclusion with all reasons.**  **1 mark if some progress is made towards conclusion**  **(ii) 2 marks for correct conclusion with all reasons.**  **1 mark if some progress is made towards conclusion** |