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| *School Name*  *Mathematics Test 2017* | | |
| Year 10 | *Geometric Reasoning* | Non Calculator |
| **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  **Full marks may 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** |
| --- | --- | --- |
|  | (a) Find the value of *p*.  …………………………………………  ………………………………………….  …………………………………………  ..………………………………………. | **2** |
|  | (b) Find the value of *x*.    …………………………………………  ………………………………………….  …………………………………………  ..………………………………………. | **2** |
|  | (c) Find the size of  ……………………………………………  ….………………………………………..  ……………………………………………  ……..…………………………………….. | **2** |
|  | (a) Find the value of y.  ……………………………………………  ….………………………………………..  ……………………………………………  ……..…………………………………….. | **2** |
|  | (b) Find the value of *d*.    …………………………………………  ………………………………………….  …………………………………………  ..……………………………………..…. | **2** |
|  | (c) Find the value of *b*.  …………………………………………  ………………………………………….  …………………………………………  ..………………………………………. | **2** |
|  | (a) Find the value of *g*.  ………………………………………………  ……………………………………………….  ………………………………………………  ………………………………………………. | **3** |
|  | (b) *ABCD* is a parallelogram.  *F* is a point on *AB* such that  Find the size of  ………………………………………………  ……………………………………………….  ………………………………………………  ………………………………………………. | **3** |
|  | (c) *PQR* is an isosceles triangle. *PR* is produced to *S*.  Find the size of .  ………………………………………………  ……………………………………………….  ………………………………………………  ………………………………………………. | **3** |
| 4. | (a)  *U* is a point on *TY* such that  Find the value of *e*.  …………………………………………  ………………………………………….  …………………………………………  ..………………………………………. | **3** |
|  | (b) In the diagram,  Find the value of *m*.  ………………………………………………  ……………………………………………….  ………………………………………………  ………………………………………………. | **3** |
|  | (c) Find the value of    ………………………………………………  ……………………………………………….  ………………………………………………  ………………………………………………. | **3** |
| 5. | (a)    ……………………………………………………………………………………  ……………………………………………....……………………………………  ……………………………………………………………………………………  ……………………………………………….…………………………………… | **3** |
|  | (b) *EF* and *GH* are two line segments which bisect one another at right angles at *O*  *FH* and *EG* are joined to create     1. Prove that   ……………………………………………………………………………………  ……………………………………………………………………………………  ……………………………………………....……………………………………  ……………………………………………………………………………………   1. *FG* and *HE* are joined to form the quadrilateral *FGEH*.   List two other pairs of congruent triangles apart from the pair in part (i).  ……………………………………………………………………………………  ……………………………………………………………………………………     1. What type of quadrilateral is *FGEH*? Give reasons for your choice.   ……………………………………………....……………………………………  …………………………………………………………………………………… | **2**  **2**  **2** |
|  | (c) The diagram below shows a regular octagon with three diameters draw inside it.     1. Show that   ……………………………………………....……………………………………  ……………………………………………………………………………………   1. Show that   ……………………………………………………………………………………  ……………………………………………....……………………………………  ……………………………………………………………………………………   1. Show that   ……………………………………………………………………………………  ……………………………………………....……………………………………  …………………………………………………………………………………… | **2**  **2**  **2** |
| 6. | (a)          ……………………………………………………………………………………  ……………………………………………....……………………………………  ……………………………………………………………………………………  ……………………………………………….…………………………………… | **3** |
|  | (b) In the diagram below *BC* || *DE*, *AB* = 15 cm, *BD* = 18 cm and *BC* = 10 cm.       1. Prove that   ……………………………………………………………………………………  ……………………………………………....……………………………………  ……………………………………………………………………………………   1. Find the length of *ED*.   ……………………………………………….…………………………………  ……………………………………………….…………………………………… | **3**  **2** |
|  | (c) In the diagram below, *P* is the centre of the smaller circle and *Q* is the centre of the larger circle.  *A* and *B* are the points of intersection of the two circles.     1. Prove that   ……………………………………………………………………………………  ……………………………………………………………………………………  ……………………………………………....……………………………………  ……………………………………………………………………………………  ……………………………………………………………………………………   1. What name best describes the type of quadrilateral for *AQBP*?   Give reasons for your choice.  ……………………………………………………………………………………  ……………………………………………....……………………………………  …………………………………………………………………………………… | **3**  **2** |

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| *School Name*  *Mathematics Test 2017* | | |
| Year 10 | *Geometric Reasoning* | Calculator Allowed  Longer Answer  Section |

ANSWERS

| Question | Answer | 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 if 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 for an answer that shows some correct reasoning.** |
|  | (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)    (i)    (ii) Other pairs include:    (iii) *FGEH* is a rhombus, as the diagonals bisect at right angles. (Or mention the congruent triangles giving all sides equal) | **(i)**  **2 marks for correct conclusion with right congruence test and all steps of reasoning given.**  **1 mark for correct conclusion with one step of reasoning incorrect or not provided or if conclusion uses wrong test**  **(ii)**  **1 mark each for any two pairs**  **(iii)**  **1 mark for correct name and 1 mark for any valid reason** |
|  | (c)  (i)    (ii)    (iii) | **(i)**  **2 marks for correct conclusion with right reasoning given.**  **1 mark for a minor error in reasoning.**  **ii)**  **2 marks for correct conclusion with right reasoning given.**  **1 mark for a minor error in reasoning.**  **iii)**  **2 marks for correct conclusion with right reasoning given.**  **1 mark for a minor error in reasoning.** |
| 6. | (a)    **Alternative** | **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)    (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) Quadrilateral *AQBP* is a kite.  Reason : There are two pairs of adjacent sides equal formed by the radii of the two circles. | **(i)**  **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**  **(ii)**  **1 mark each for name of quadrilateral and any valid reason which quotes a property unique to a kite.** |