

Mathematics Assessment

**Bands 5-7 Problem Solving – Test 2**

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**Calculators allowed on questions with this symbol:**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Class: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Teacher: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Remember:

* The test is 1 hour long.
* You will need: pen, pencil, rubber and a ruler.
* Try to answer all questions.
* Write all your answers and working in the spaces provided in this test paper – do not use any rough paper. Marks may be awarded for working.
* Check your work carefully.
* Don’t spend too long on one question. Leave it and try the next one.

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| Formulae Sheet |
| Perimeter, area, surface area and volume formulae |
| Sphere | Cone |
|  |  |
| Volume = $\frac{4}{3}$πr3Surface Area = 4πr2 | Volume = $\frac{1}{3}$ πr2hCurved Surface Area = πrl |

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| 1. | You multiply three powers of 9 together. What could the indices be when:1. All the indices are the same?

\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_1. All the indices are different?

\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_ | / 2 |
| 2. | A Formula 1 racing car has a top speed of 350 km/h. A peregrine falcon is the fastest bird with a speed of 108 m/s. Which is fastest? Explain your answer. | / 4 |

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| 3. | The area of triangle ABC is 21 cm². Calculate the size of the obtuse angle ABC. Give your answer to a suitable degree of accuracy.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ° | / 3 |
| 4. | A sheet of A2 paper and a sheet of A4 paper are similar. The area ofa sheet pf A2 paper is 2500 cm² and the area of a sheet of A4 paper is 625 cm². The width of a sheet of A4 paper is 21 cm. What is the width of a sheet of A4 paper?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm | / 4 |
| 5. | A rectangular piece of paper has length (x + 5) cm and width (x + 2) cm. A square with sides x cm is removed. Find x if the shaded area is 31 cm².x = \_\_\_\_\_\_\_\_\_\_\_\_ cm | / 4 |
| 6. | Rugs come in several shapes and sizes. A small rug has dimensions a x a. A large rug has dimensions 2a x (a + 1). The area of the large rug is 12 m². What are the dimensions of the small rug?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | / 7 |
| 7. | Some students did a French test and a German test. Here are their results. French test results: 44 28 39 50 14 20 32 34 20 45 31German test results:50 25 38 36 31 22 54 45 51 48 42On the grid, draw diagrams that could be used to compare the French test results with the German test results.http://www.eeweb.com/tools/graph-paper/images/engineering-graph-paper-small.png Make one comparison between the French test results and the German test results. | / 4 |

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| 8. | The cost of fuel per hour, C (in £), to propel a boat through the water is directly proportional to the cube of its speed, s (in mph). A boat travelling at 10 mph uses £50 of fuel per hour. What is the cost of fuel per hour when the boat is travelling at 5 mph?£ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | / 5 |
| 9. | Calculate the area of the shaded segment. Give you answer correct to 3 decimal places.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm² | / 6 |
| 10 | A rectangle is placed symmetrically inside a square.The rectangle has sides of length m and n. Find the area of the square in terms of m and n.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | / 4 |

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| 11. | Here is part of the graph of a quadratic function. Find the equation of the graph.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | / 4 |