

Mathematics Assessment

**Band 5 – Test 3**

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

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

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

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

Remember:

* The test is 1 hour long.
* You **must not** use a calculator for any question in this test without a calculator symbol.
* You will need: compasses, pen, pencil, protractor, rubber and a ruler.
* Some formulae you might need are on the next page.
* 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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| **A – Ratio and Proportion** |
| 1. | Gwen bought a new car. Each year, the value of her car depreciated by 9%. Calculate the number of years after which the value of her car was 47% of its value when new.\_\_\_\_\_\_years | / 3 |
| 2. | *q* is inversely proportional to the square of *t*. When *t* = 4, *q* = 8.5. Find a formula for *q* in terms of *t*.\_\_\_\_\_\_\_\_\_\_Calculate the value of *q* when *t* = 5\_\_\_\_\_\_\_\_\_\_ | / 4 |
| **B – Number**  |
| 3. | Work out the value of ( $\frac{9}{4}$ )3/2\_\_\_\_\_\_\_\_\_\_\_\_ | / 2 |
| 4. | Work out (4 × 103) ÷ (8 × 105)Give your answer in standard form.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  | / 2 |
| **C - Algebra** |
| 5. | Complete the table of values for *y* = *x*3 + 3*x*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *x* | –2 | –1 | 0 | 1 | 2 |
| *y* | –14 |  | 0 |  |  |

On the grid, draw the graph of *y* = *x*3 + 3*x* | / 4 |
| 6. | A straight line **L** is parallel to *y* = 2*x* – 3 and passes through the point (3,4). Find the equation of line **L**.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  | / 3 |
| 7. | Factorise x² - 3x - 40\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Solve the equation x² - 3x – 40 = 0\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | / 3 |
| 8. | Solve the simultaneous equations3*x* + *y* = 1*x –* 2*y* = 19x = \_\_\_\_\_y = \_\_\_\_\_ | / 4 |
| 9. | Make *x* the subject of the formula.x = \_\_\_\_\_\_\_\_\_\_\_\_  | / 4 |
| 10. | Solve the inequality 3*t* + 1 < *t* + 12\_\_\_\_\_\_\_\_\_\_\_\_  | / 2 |
| **D – Shape, Space and Measure** |
| 11. |  Diagram **NOT** accurately drawnIn the diagram, *AB* = *BC* = *CD* = *DA*. Prove that triangle *ADB* is congruent to triangle *CDB*. | / 3 |
| 12. | Scale: 1 centimetre represents 2 metresThe diagram shows a scale drawing of a garden. Haavi is going to plant a tree in the garden. The tree must be less than 5 metres from the fountain, less than 9 metres from the bench.On the diagram show, by shading, the region in which Haavi can plant the tree. | / 3 |
| 13. |  Diagram **NOT** accurately drawnWork out the value of *x*. Give your answer correct to 1 decimal place.x = \_\_\_\_\_\_\_\_\_\_ º | / 3 |
| 14. | Enlarge P by scale factor ½ from centre (5, 3). Label it Q.Translate P by vector $\left[\begin{matrix}-1\\5\end{matrix}\right]$. Label it R. | / 5 |
| 15. | Diagram **NOT** accurately drawnThe arc length of the sector is 15 cm. Calculate the angle AOB.Give your answer correct to 3 significant figures.\_\_\_\_\_\_\_\_\_\_\_ º  | / 3 |
| 16. | Diagram **NOT** accurately drawnThe diagram represents a cone. Calculate the curved surface area of the cone. Give your answer correct to 2 decimal places.\_\_\_\_\_\_\_\_\_\_\_ cm²  | / 3 |
| 17. | Diagram **NOT** accurately drawnThe diagram shows two quadrilaterals that are mathematically **similar**. In quadrilateral *PQRS*, *PQ* = 8 cm, *SR* = 4 cm. In quadrilateral *ABCD*, *AD* = 15 cm, *DC* = 10 cm. Angle *PSR* = angle *ADC.* Angle *SPQ* = angle *DAB.* Calculate the length of *AB*.\_\_\_\_\_\_\_\_\_ cmCalculate the length of *PS*.\_\_\_\_\_\_\_\_\_ cm | / 4 |
| **E – Data Handling** |
| 18. | Rosie had 10 boxes of drawing pins. She counted the number of drawing pins in each box. The table gives information about her results.

|  |  |  |
| --- | --- | --- |
| Number ofdrawing pins | Frequency |  |
| 29 | 2 |  |
| 30 | 5 |  |
| 31 | 2 |  |
| 32 | 1 |  |

Work out the mean number of drawing pins. \_\_\_\_\_\_\_\_\_\_\_\_ | / 3 |
| 19. |  The table gives information about the numbers of students in the two years of a college course. Anna wants to interview some of these students. She takes a random sample of 70 students stratified by year and by gender.

|  |  |  |
| --- | --- | --- |
|  | Male | Female |
| First year | 399 | 602 |
| Second year | 252 | 198 |

Work out the number of students in the sample who are male and in the first year.\_\_\_\_\_\_\_\_\_\_\_\_ | / 2 |

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| **F – Probability** |
| 20. | Nicola is going to travel from Swindon to London by train. The probability that the train will be late leaving Swindon is . If the train is late leaving Swindon, the probability that it will arrive late in London is . If the train is **not** late leaving Swindon, the probability that it will arrive late in London is . Complete the probability tree diagram.Work out the probability that Nicola will arrive late in London.\_\_\_\_\_\_\_\_\_ | / 4 |