

Mathematics Assessment

**Band 7 – Test 2**

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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** |
| **B – Number**  |
| 1. | Expand and simplify \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | / 3 |
| 2. | Rationalise the denominator of $\frac{2}{\sqrt{8}}$.\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | / 2 |
| **C – Algebra**  |
| 3. | Solve the equationx = \_\_\_\_\_\_\_\_\_  | / 3 |
| 4. | Solve the equation $\frac{3}{x+2}+ \frac{5}{2x-1}=2$ giving your answers to 3 significant figures.x = \_\_\_\_\_\_\_\_\_  | / 4 |
| 5. |  The curve with equation y = f(x) is translated so that the point at (0, 0) is mapped onto the point (4, 0). Find an equation of the translated curve.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_The grid shows the graph of y = cos x° for values of x from 0 to 540. On the grid, sketch the graph of y = 3 cos (2x°) for values of x from 0 to 540 | / 4 |
| 6. | Complete the table of values for the graph of *y* = 4*x*(11 - 2*x*)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **x** | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| **y** | 0 |  |  | 60 |  |  | -24 |

On the grid, draw the graph of *y* = 4*x*(11 - 2*x*)Identify the turning point of the graph \_\_\_\_\_\_\_\_\_\_\_\_ | / 5 |
| 7. | Given that *x*2 – 14*x* + *a* = (*x* + *b*)2 for all values of *x*, find the value of *a* and the value of *b*.a = \_\_\_\_\_\_\_\_\_\_b = \_\_\_\_\_\_\_\_\_\_ | / 3 |
| 8. | On the grid below, draw straight lines and use shading to show the region **R** that satisfies the inequalities *x* ≥ 2 *y* ≥ *x* *x* + *y* ≤ 6 | / 4 |
| **D – Shape, Space and Measure** |
| 9. |  Diagram **NOT** accurately drawn*A*, *B*, *C* and *D* are four points on the circumference of a circle.*ABE* and *DCE* are straight lines. Angle *BAC* = 25°. Angle *EBC* = 60°. Find the size of angle *ADC*.\_\_\_\_\_\_\_\_\_\_\_\_ºFind the size of angle *ADB.*\_\_\_\_\_\_\_\_\_\_\_\_ºAngle *CAD* = 65°. Ben says that *BD* is a diameter of the circle. Is Ben correct? You must explain your answer.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | / 4 |
| 10. |  Diagram **NOT** accurately drawnUse the cosine rule to calculate angle PQR in triangle PQR. Give your answer correct to 3 significant figures.\_\_\_\_\_\_\_\_\_\_\_º | / 3 |
| 11. | Diagram **NOT** accurately drawnUse the sine rule to calculate length XY in triangle XYZ. Give your answer correct to 3 significant figures.\_\_\_\_\_\_\_\_\_\_\_cm | / 3 |
| 12. | Diagram **NOT** accurately drawnABCD is a straight line. O is a point so that  and .B is the midpoint of AC. C is the midpoint of AD. Express  in terms of **a** and **b**. Give your answer in its simplest form.  = \_\_\_\_\_\_\_\_\_\_\_\_\_Express  in terms of **a** and **b**. Give your answer in its simplest form. = \_\_\_\_\_\_\_\_\_\_\_\_\_ | / 3 |
| 13. | A train is travelling at 10 m/s-1 on a straight horizontal track. The driver sees a red signal ahead and immediately applies the brakes. The train immediately decelerates with constant deceleration for 12 s, reducing its speed to 3 m/s-1. The driver then releases the brakes and allows the train to travel at a constant speed of 3 m/s-1 for a further 15 s. He then applies the brakes again and the train slows down with constant deceleration for 8 s, coming to rest as it reaches the signal. Sketch a speed-time graph to show the motion of the train. | / 3 |
| **E – Data Handling** |
| 14. | A company tested 100 batteries. The table shows information about the time in hours that the batteries lasted. Complete the cumulative frequency table.

|  |  |  |
| --- | --- | --- |
| **Time (t hours)** | **Frequency** | **Cumulative frequency** |
| 50 ≤ t < 55 | 12 |  |
| 55 ≤ t < 60 | 21 |  |
| 60 ≤ t < 65 | 36 |  |
| 65 ≤ t < 70 | 23 |  |
| 70 ≤ t < 75 | 8 |  |

On the grid, draw a cumulative frequency graph for your completed table.Use your completed graph to find an estimate for the median time.\_\_\_\_\_\_\_\_\_\_\_hours | / 4 |
| 15. | Lottie measured the heights, in centimetres, of the girls in her class. The table shows some information about the heights.

|  |  |
| --- | --- |
| Height of shortest girl | 137 cm |
| Height of tallest girl | 180 cm |
| Median | 162 cm |
| Lower quartile | 148 cm |
| Upper quartile | 172 cm |

 On the grid, draw a box plot to show this information. | / 3 |
| **F – Probability** |