

Mathematics Assessment

**Band 7 – 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** |
| **B – Number**  |
| 1. | Expand and simplify (2 + )(7 – )\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | / 3 |
| 2. | Rationalise the denominator of $\frac{4}{\sqrt{20}}$.\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | / 2 |
| **C – Algebra**  |
| 3. | Solve the equation $\frac{x+1}{3}+ \frac{x+3}{2}=10$x = \_\_\_\_\_\_\_\_\_  | / 3 |
| 4. | Solve the equation $\frac{3}{x-1}+\frac{2}{2x+3}=5$Giving your answer to 3 significant figuresx = \_\_\_\_\_\_\_\_\_\_\_\_  | / 4 |
| 5. | The graph of *y* = f(*x*) is shown on the grids. On this grid, sketch the graph of *y* = f(*x*) + 2On this grid, sketch the graph of *y* = – f(*x*) | / 4 |
| 6. | Complete the table for *y* = *x*2 – 2*x* – 4

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **x** | -2 | -1 | 0 | 1 | 2 | 3 | 4 |
| **y** | 4 |  | -4 | -5 |  | -1 |  |

On the grid, draw the graph of *y* = *x*2 – 2*x* – 4Identify the turning point of the graph \_\_\_\_\_\_\_\_\_\_\_\_ | / 5 |
| 7. | Solve *x*2 – 2x – 1. Give your answers in the form *p* + √*q*, where *p* and *q* are integers.\_\_\_\_\_\_\_\_\_\_\_\_ | / 3 |
| 8. | On the grid, show by shading, the region which satisfies all three of the inequalities. Label the region **R**.*x* < 3 *y* > –2 *y* < *x* | / 4 |
| **D – Shape, Space and Measure** |
| 9. |  Diagram **NOT** accurately drawn*A, B, C* and *D* are points on the circumference of a circle, centre *O. BOD* is a straight line. Angle *COD =* 70°. Find the size of angle *BAD.* Give a reason for your answer.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Find the size of angle *CBD.* Give a reason for your answer.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | / 4 |
| 10. |  Diagram **NOT** accurately drawnUse the cosine rule to calculate length QR in triangle PQR. Give your answer correct to 3 significant figures.\_\_\_\_\_\_\_\_\_\_\_cm | / 3 |
| 11. | Diagram **NOT** accurately drawnUse the sine rule to calculate angle XZY in triangle XYZ. Give your answer correct to 3 significant figures.\_\_\_\_\_\_\_\_\_\_\_º | / 3 |
| 12. | Diagram **NOT** accurately drawn*OABC* is a trapezium. *OC* is parallel to *AB*.  = **a**,  = **c***AB* = 2*OC*. *X* is the point on *AB* such that *AX*:*XB* = 3:1.Express  in terms of **a** and **c**.= \_\_\_\_\_\_\_\_\_\_\_\_\_ | / 3 |
| 13. | A particle moves along a straight line. The particle accelerates uniformly from rest to a speed of 8 m/s-1 in 10 secs. The particle then travels at a constant speed of 8 m/s-1 for 50 secs. The particle then decelerates uniformly to rest in a further 40 secs. Sketch a speed-time graph to show the motion of the particle. | / 3 |
| **E – Data Handling** |
| 14. | The table shows information about the ages of the 240 people at a club. Complete the cumulative frequency table.

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| --- | --- | --- |
| **Age (t years)** | **Frequency** | **Cumulative frequency** |
| 15 ≤ t < 20 | 95 |  |
| 20 ≤ t < 25 | 90 |  |
| 25 ≤ t < 30 | 35 |  |
| 30 ≤ t < 35 | 15 |  |
| 35 ≤ t < 40 | 5 |  |

On the grid, draw the cumulative frequency graph for your table.Use your graph to find an estimate for the median age of the people.\_\_\_\_\_\_\_\_\_\_\_\_\_ years | / 4 |
| 15. | Some students took a test. The table shows information about their marks.

|  |  |
| --- | --- |
| Minimum mark | 10 |
| Lower quartile | 33 |
| Interquartile range | 35 |
| Median mark | 43 |
| Range | 65 |

 Use this information to draw a box plot. | / 3 |
| **F – Probability** |