

Mathematics Assessment

**Band 7 – Test 1**

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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.

|  |  |
| --- | --- |
| Formulae Sheet | |
| Perimeter, area, surface area and volume formulae | |
| Sphere | Cone |
|  |  |
| Volume = πr3  Surface Area = 4πr2 | Volume = πr2h  Curved Surface Area = πrl |

|  |  |  |
| --- | --- | --- |
| **A – Ratio and Proportion** | | |
| **B – Number** | | |
| 1. | Expand and simplify  \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | / 3 |
| 2. | Rationalise the denominator of .  \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | / 2 |
| **C – Algebra** | | |
| 3. | Solve += 2  x = \_\_\_\_\_\_\_\_\_ | / 3 |
| 4. | Solve the equation      x = \_\_\_\_\_\_\_\_\_ | / 4 |
| 5. | The graph of *y* = f(*x*) is shown on the grids. On this grid, sketch the graph of *y* = f(*x*) – 4    On this grid, sketch the graph of *y* = f(*x*). | / 4 |
| 6. | Complete the table of values for *y* = *x*2– 3*x* +1   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | **x** | -2 | -1 | 0 | 1 | 2 | 3 | 4 | | **y** | 11 |  | 1 | -1 |  |  | 5 |   On the grid, draw the graph of *y = x*2 *–* 3*x* + 1    Identify the turning point of the graph \_\_\_\_\_\_\_\_\_\_\_\_ | / 5 |
| 7. | Solve *x*2 + 6*x* = 4. Give your answers in the form *p* + √*q*, where *p* and *q* are integers.  \_\_\_\_\_\_\_\_\_\_\_\_ | / 3 |
| 8. | –2 < x ≤ 1 y > –2 y < x + 1  x and y are integers. On the grid, mark with a cross (), each of the six points which satisfies all these 3 inequalities. | / 4 |
| **D – Shape, Space and Measure** | | |
| 9. | Diagram **NOT** accurately drawn  In the diagram, A, B and C are points on the circle, centre O. Angle BCE = 63°. FE is a tangent to the circle at point C. Calculate the size of angle ACB. Give reasons for your answer.  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Calculate the size of angle BAC. Give reasons for your answer.  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | / 4 |
| 10. | Diagram **NOT** accurately drawn  Use the cosine rule to calculate length PR in triangle PQR. Give your answer correct to 3 significant figures.  \_\_\_\_\_\_\_\_\_\_\_cm | / 3 |
| 11. | Diagram **NOT** accurately drawn  Use the sine rule to calculate angle YXZ in triangle XYZ. Give your answer correct to 3 significant figures.  \_\_\_\_\_\_\_\_\_\_\_º | / 3 |
| 12. | Diagram **NOT** accurately drawn  *OPQ* is a triangle. *T* is the point on *PQ* for which *PT* : *TQ* = 2 : 1.  = **a** and  = **b**. Write down, in terms of **a** and **b**, an expression for .  = \_\_\_\_\_\_\_\_\_\_\_\_\_  Express  in terms of **a** and **b**. Give your answer in its simplest form.  = \_\_\_\_\_\_\_\_\_\_\_\_\_ | / 3 |
| 13. | A car is waiting at traffic lights. When the lights turn green, the car accelerates uniformly from rest to a speed of 10m/s-1 in 20 secs. This speed is then maintained until the car passes a road sign 50 secs after leaving the traffic lights. Sketch a speed-time graph to show the motion of the car. | / 3 |
| **E – Data Handling** | | |
| 14. | The table shows information about the heights of 40 bushes. Complete the cumulative frequency table.   |  |  |  | | --- | --- | --- | | **Height (h cm)** | **Frequency** | **Cumulative frequency** | | 170 ≤ h < 175 | 5 |  | | 175 ≤ h < 180 | 18 |  | | 180 ≤ h < 185 | 12 |  | | 185 ≤ h < 190 | 4 |  | | 190 ≤ h < 195 | 1 |  |   On the grid, draw a cumulative frequency graph for your table.    Use the graph to find an estimate for the median height of the bushes.  \_\_\_\_\_\_\_\_\_\_\_ cm | / 4 |
| 15. | The incomplete box plot and table show some information about some marks.     |  | | --- | | Mark | | Lowest mark | 5 | | Lower quartile |  | | Median | 30 | | Upper quartile | 35 | | Highest mark | 55 |     Use the information in the table to complete the box plot.  Use the information in the box plot to complete the table. | / 3 |
| **F – Probability** | | |