SHENTON COLLEGE

# ATMAS Mathematics Specialist

## Test 2 Calculator Free

Name: ……

Teacher: Mr Smith

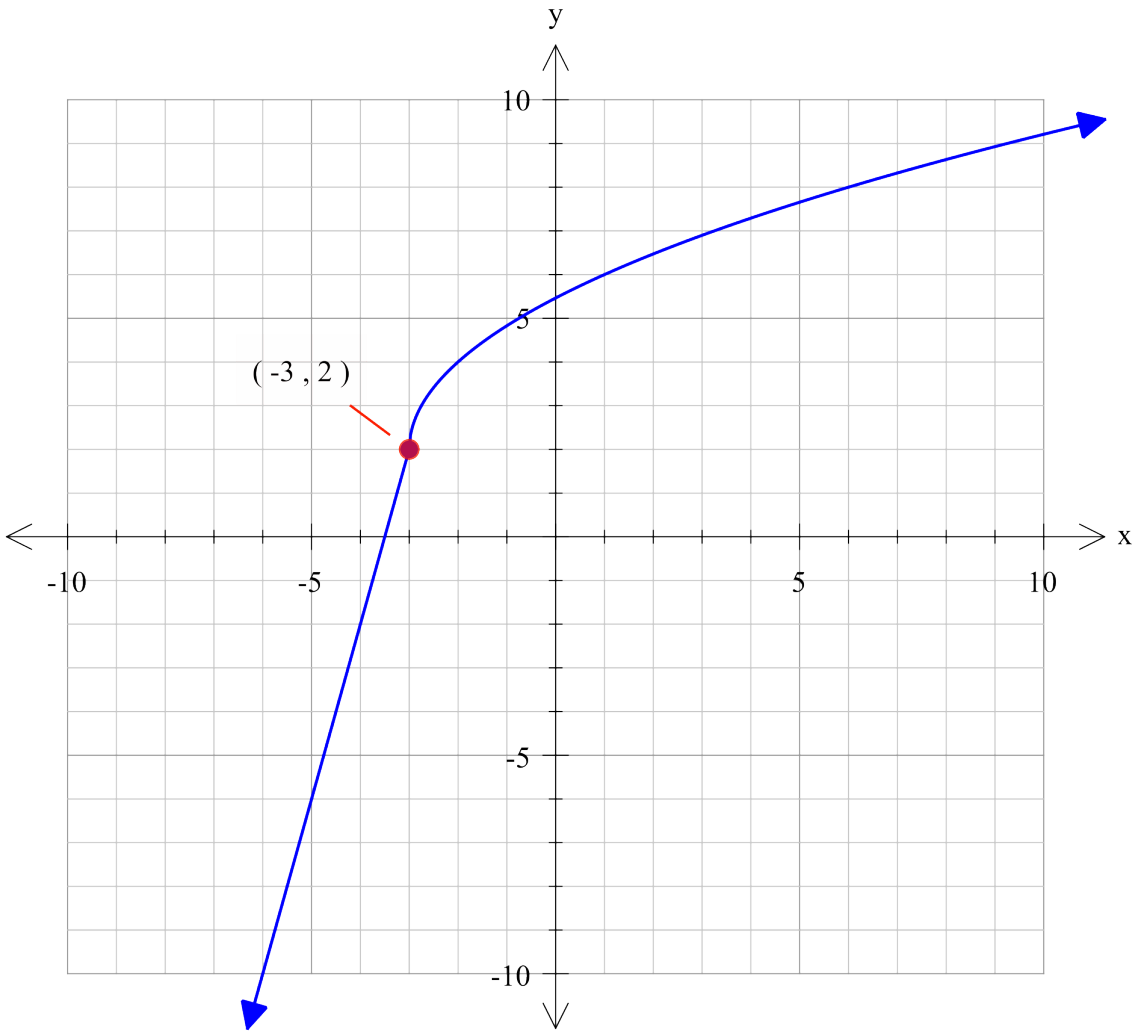
Time Allowed : 30 minutes

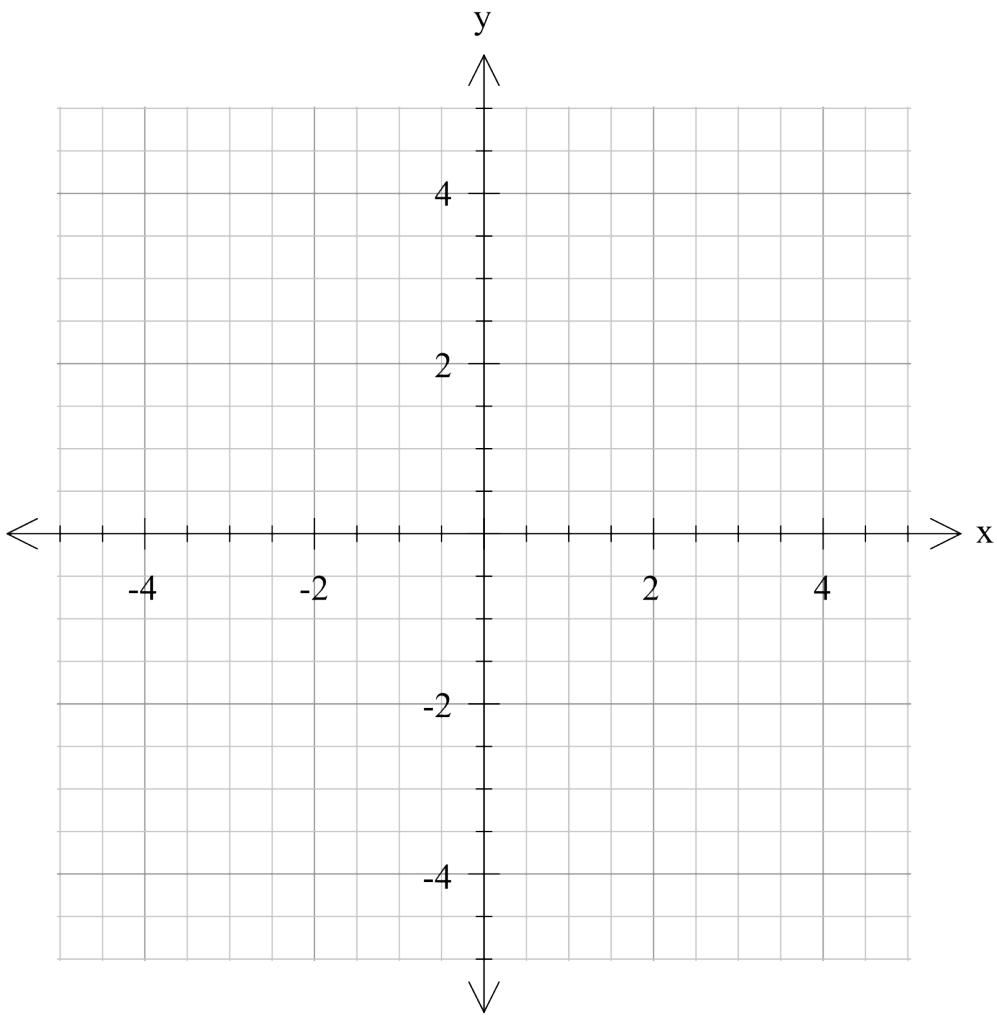
Marks /28

***Materials allowed:*** No special materials.

***Attempt all questions.***
***All necessary working and reasoning must be shown for full marks.***
*Where appropriate, answers should be given in exact values.*
*Marks may not be awarded for untidy or poorly arranged work.*

| | | | |
|---|---|---|---|
| **1** | | Determine which of the following functions are one-to-one. For those functions which are one-to-one, find their inverse. | (6) |
| | a) | $(x-2)^2+(y+3)^2=16$ | |
| | b) | $y=\dfrac{1}{x-2}$ | |
| | c) | $(x-2)^2+4$ | |
| | d) | $(x-2)^3+4$ | |
| | | | |

| | | | |
|---|---|---|---|
| **2** | | Below is a graph of $y = f(x)$. On the same set of axes, sketch the graph of $y = f^{-1}(x - 2)$. | (3) |
| | |  | |
| **3** | | If $f(x) = \sin 2x$ and $g(x) = x^2 + 2$, | |
| | | Determine $g(f(x))$, giving the domain and range of the composition. | (3) |

| | | | |
|---|---|---|---|
| **4** | | If $f(x) = e^x$ and $g(x) = \frac{1}{x-1}$, | |
| | a) | Determine $g(f(x))$, giving the domain and range of the composition. | (3) |
| | b) | Draw a rough sketch of the composite function $y = g(f(x))$, indicating any important features.   | (3) |
| | | | |

| | | | |
|---|---|---|---|
| **5** | | If $h(x) = \frac{1}{4^x}$ and $h\big(k(x)\big) = 2^{2-2x-2x^2}$, find the equation of $k(x)$. | (4) |
| | | | |
| **6** | | The function f(x) is defined as f(x) = \|x + 1\| + \|x – 2\|**.** | |
| | a) | Complete the following… | (3) |

$$f(x) = \begin{cases} \_\_\_\_\_ & \text{for} \quad x < -1 \\ \_\_\_\_\_ & \text{for} \quad -1 \le x \le 2 \\ \_\_\_\_\_ & \text{for} \quad x > 2 \end{cases}$$

| | | | |
|---|---|---|---|
| | b) | Sketch the function f(x) = \|x + 1\| + \|x – 2\| on the set of axes below. | (3) |