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**NAME:**

**11AEMAM Test 3 2021**

**Section 1: /**

**Section 2: /**

**Total: /**

**%**

**TIME ALLOCATION FOR THIS TEST**

**Section 1 – No Calculators Allowed**

**minutes reading time: 2 minutes**

**minutes working time: 20 minutes**

**Section 2 – Calculators allowed**

**minutes reading time: 3 minutes**

**minutes working time: 25**

**Material required/recommended for this test**

**To be provided by the supervisor**

Question/answer booklets for Sections One and Two.

SCSA 11AEMAM Formulae Sheet

**To be provided by the candidate**

***Section One:***

Standard items: pens, pencils, pencil sharpener, highlighter, eraser, ruler

*Special materials: drawing instruments, templates, notes on a maximum of one unfolded sheet of A4 paper*

**Section Two:**

Standard items: pens, pencils, pencil sharpener, highlighter, eraser, ruler

*Special materials: drawing instruments, templates, notes on a maximum of one unfolded sheet of A4 paper, notes on a maximum of one unfolded sheet of A4 paper, up to three approved calculators, CAS, graphics, or scientific.*

**Important note to candidates**

No other items may be taken into the test room. It is **your** responsibility to ensure that you do not have any unauthorised notes or other items of a non-personal nature in the test room. If you have any unauthorised material with you, hand it to the teacher **before** reading any further.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Section** | **Reading Time** | **Working time** | **Marks** | **Score** |
| **Resource free** | **2 minutes** | **20** | **20** | **%** |
| **Resource rich** | **3 minutes** | **25** | **23** | **%** |
| **Total** | **5 minutes** | **45** | **43** | **%** |

**Calculator Free Section: 25 minutes**

1. **[2 marks]**

Consider the function shown. Decide whether it is linear, quadratic or neither:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| x | 0 | 1 | 2 | 3 | 4 | 5 |
| f(x) | -3 | 1 | 7 | 15 | 25 | 37 |

1. **[4 marks: 2, 1, 1]**

For the function f(x) = (2 – x)(x + 4)

1. Solve when f(x) = 0
2. What is the y-intercept of the function?
3. What is the axis of symmetry of the function?
4. **[3 marks : 1, 1, 1]**

A quadratic function is given by

For this function determine

1. The coordinates of the y-intercept
2. The equation of the line of symmetry

c) The coordinates of the turning point

1. **[5 marks – 2, 3]**

A quadratic has equation. Determine

i. The location and nature of the turning point.

ii. the **exact values** of the zeros of the quadratic.

|  |  |
| --- | --- |
| 1. **[6 marks: 1, 2, 1, 2]** | |
| For the function , determine: | |
| 1. The equation of the line of symmetry |  |
| 1. The location and nature of the turning point |  |
| 1. The y-intercept |  |
| 1. Sketch the function |  |
|  | |

END OF CALCULATOR FREE SECTION

**Calculator Allowed Section** Name: …………………………………

Reading time: 2 minutes

Working time: 25 minutes Marks: 23

1. **[5 marks: 1, 1, 1, 1, 1]**A student was asked to sketch the graph of *y* = (*x* − 1)2 − 5. The sketch drawn by the student is reproduced below and represents the temperature yoC of an object changing with time x (minutes).



1. Which values of x are valid (make sense) if x represents time?
2. What was the initial temperature of the object?
3. When did the body's temperature reach 0o?
4. What was the minimum temperature reached by the body?
5. When was the minimum temperature reached?
6. **[10 marks: 2, 2, 3, 3]**

A bridge over a freeway is in the form of a parabola, supported on both sides  
by a 3 metre high concrete pillar.

 The height above ground level for any value x measured from the base of the left hand pillar is given by

a) Calculate the height of the bridge 3 metres from the left hand pillar.  
  
  
  
  
b) Calculate the width of the freeway from pillar to pillar.

c) How far from the left hand pillar is the height of the bridge 4.5 metres?

d) A train line is to be built in the centre of the freeway. What is the maximum height of the train, if it is to pass safely under the bridge with a two metre clearance? Assume that the train has a width of 2 metres and a flat roof.

|  |
| --- |
| 1. **[4 marks: 1, 1, 2]** |
| Solve the following quadratic equations by factorising or using the quadratic formula (in simplified exact form). Show your working out to receive full marks: |
|  |
| |  |  |  | | --- | --- | --- | | 1. **[4 marks]** | | | | Isabel throws a ball for her dog to catch. The path of the ball is parabolic and can be modelled by the equation  where h is the height in metres of the ball above the ground and x is the horizontal distance of the ball from Isabel.  If Isabel’s dog is 4m away from her, how far does he have to jump to catch the ball?  Provide a sketch to illustrate your answer. | | | |  |  |  | |

**THIS PAGE HAS BEEN LEFT BLANK INTENTIONALLY TO PROVIDE SPACE FOR WORKING IF REQUIRED**

**END OF TEST**