NORMANHURST BOYS HIGH SCHOOL

STAGE 5.1-5.3 MATHEMATICS

2018 Year 10 Assessment Task 2
Monday, 21 May 2018

General instructions

- Working time – 55 minutes.
- Write using blue or black pen. Where diagrams are to be sketched, these may be done in pencil.
- NESA approved calculators may be used.
- Attempt all questions.
- At the conclusion of the examination, bundle the sheets used in the correct order within this paper and hand to examination supervisors.

SECTION I

- Mark your answers on the answer grid provided

SECTION II

- Commence each new question on a new sheet. Write on both sides of the paper.
- All necessary working should be shown in every question. Marks may be deducted for illegible or incomplete working.

STUDENT NAME: ..... **# SHEETS USED:** .....

Class: (please ✓)

- ○ 10MAT.N - Mrs Gan
- ○ 10MAT.B - Mrs Lam
- ○ 10MAT.H - Mrs Dupuche
- ○ 10MAT.S - Mr Tan

Marker's use only

QUESTION	1-9	10	11	12	Total	%
MARKS	/9	/15	/13	/15	/52	

Section I

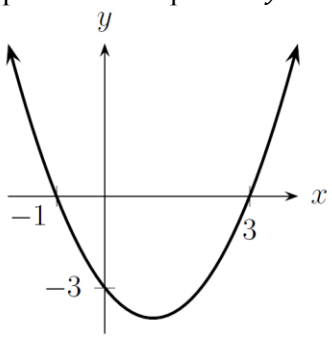
9 marks
Attempt Questions 1 to 9
Allow approximately 10 minutes for this section

Mark your answers on the answer grid provided.

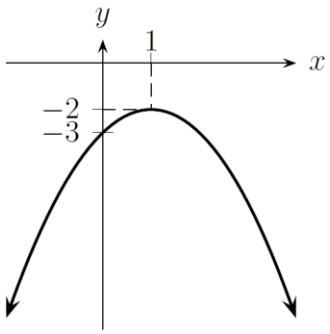
Questions **Marks**

1. Which graph represents the equation $y = -x^2 + 2x - 3$? **1**

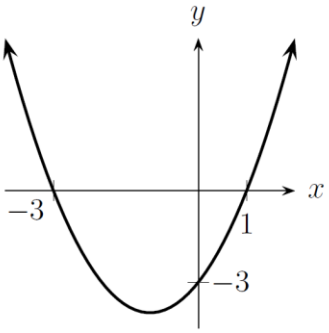
(A)



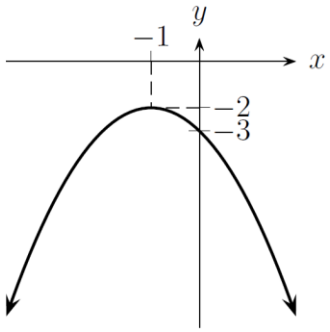
(C)



(B)



(D)



2. Which equation has the "steepest" graph? **1**

(A) $y = 6x^2 - 7x + 1$
(B) $y = -4x^2 + 5x + 4$
(C) $y = \frac{1}{2}x^2 + 2x$
(D) $y = -\frac{1}{4}x^2 - 3x + 1$

3. Which of the following values of x are the solutions to the equation $x^2 - 3x = 10$? **1**

(A) $x = 0, x = -3$
(B) $x = -5, x = 2$
(C) $x = 0, x = 3$
(D) $x = -2, x = 5$

4. Which of the following gives the equation of the axis of symmetry to the graph of **1**

$$y = 2(x-3)^2 - 4$$

(A) $x = 3$ (B) $x = -3$ (C) $y = 3$ (D) $x = 2$

5. Which of the following two statements are true for the function $f(x) = -x^2 + 6x - 2$? **1**

I. $f(2) = 6$
II. $f(-1) = 9$

(A) I. only (B) II. only (C) I. and II. (D) Neither I. or II.

6. Which statement below best describes the x-intercepts of the graph of $y = 3x^2 - 5x + 20$? **1**

(A) Two rational x intercepts
(B) No x-intercepts
(C) One rational x intercept
(D) Two irrational x intercepts

7. Which of the following represents $y = x^2$ after it has been translated 3 units up and 2 units to the right? **1**

(A) $y = (x-3)^2 + 2$
(B) $y = (x-2)^2 + 3$
(C) $y = (x+3)^2 + 2$
(D) $y = (x+2)^2 - 2$

8. What is the domain of this function: $\{(0,1), (2,3), (-1,3), (4,5)\}$? **1**

(A) $\{3\}$
(B) $\{-1, 0, 2, 4\}$
(C) $\{0,2\}$
(D) $\{1, 3, 5\}$

9. Given that $h(x) = 5x^2 + 3x - 2$, which pair of equations below are possible equations for $f(x)$ and $g(x)$ so that $h(x) = f(x) - g(x)$ **1**

(A) $f(x) = 5x^2$, $g(x) = -3x + 2$
(B) $f(x) = 4x^2$, $g(x) = -x^2 - 3x - 2$
(C) $f(x) = 4x^2$, $g(x) = x^2 + 3x - 2$
(D) $f(x) = 5x^2$, $g(x) = 3x - 2$

Answer grid for Section I

Mark answers to Section I by fully blackening the correct circle

1 – (A) (B) (C) (D)
2 – (A) (B) (C) (D)
3 – (A) (B) (C) (D)
4 – (A) (B) (C) (D)
5 – (A) (B) (C) (D)
6 – (A) (B) (C) (D)
7 – (A) (B) (C) (D)
8 – (A) (B) (C) (D)
9 – (A) (B) (C) (D)

Section II

43 marks
Attempt Questions 10 to 12
Allow approximately 45 minutes for this section.

Write your answers in the writing sheets supplied. Additional writing sheets are available.
Your responses should include relevant mathematical reasoning and/or calculations.

Question 10 (15 marks) Commence a NEW sheet **Marks**

(a) Factorise $x^2 - 6x + 3$ by completing the square. **2**

(b) Find the value(s) of x given $g(x) = 2 - 4x$, $h(x) = x^2 + 9x + 14$, and $g(x) = h(x)$ **2**

(c) Using $\frac{1}{3}$ of the page, draw neat sketches of the following:

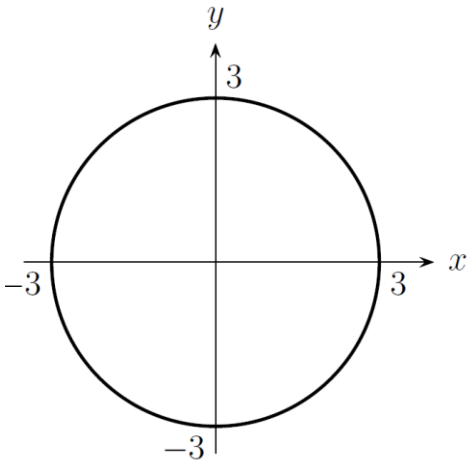
i. $y = -(x + 2)^2 + 6$, showing any x-intercept(s), y-intercept(s) and the coordinates of the vertex. **4**

ii. $y = -x^3 - 6$, showing the y-intercept and any other important features. **2**

(d) State the domain and range, and the find coordinates of the vertex for **3**

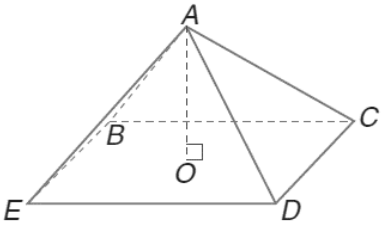
$$y = x^2 - 3x + 3$$

(e) State the domain and range of the following graph: **2**



Question 11 (13 marks) Commence a NEW sheet **Marks**

(a) Calculate the surface area of the following pyramid. Give your answer correct to one decimal place where necessary. **3**

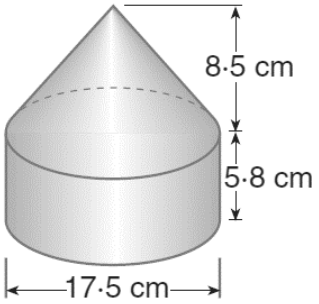


BCDE is a rectangle.
AO = 4 cm, *ED* = 10 cm,
DC = 6 cm.

(b) A cone with a radius of 5 cm has a surface area of 200π cm^2. **3**

What is the **exact** perpendicular height of the cone?

(c) Calculate the volume of the following solid. Give your answer correct to three significant figures. **4**



(d) A spherical shaped tank is designed to hold 100 m^3 . **3**

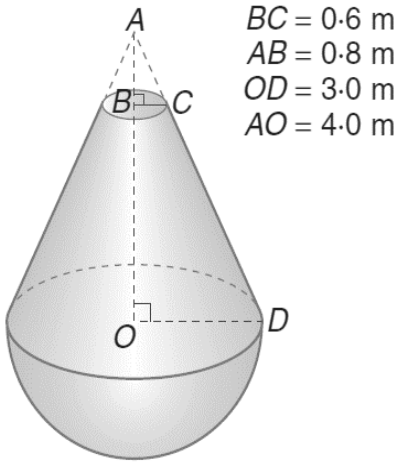
What radius (correct to the nearest millimetre) will result in this volume?

Examination continues overleaf…

Question 12 (15 marks) Commence a NEW sheet **Marks**

(a) Find the point(s) of intersection of functions, $5x + y = 11$ and $y = 3 + 5x - 2x^2$ **3**

(b) Calculate the surface area of the following solid. Give your answer correct to 2 decimal places. **4**



(c) A block of land for sale has a length of x metres. Its width is 8 metres less than its length. **4**

A farmer will only purchase the land if it measures exactly 240 square metres.

What value of x will cause the farmer to purchase the land?

(d) The sum of the areas of two circles is 106π cm^2. **4**

The radius of the larger circle is 4 cm longer than the radius of the smaller circle.

Find the radii of the two circles.

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