NORMANHURST BOYS HIGH SCHOOL

STAGE 5.1-5.3 MATHEMATICS

Year 10 Assessment Task 2

Tuesday, 16 May 2017

General instructions

- Working time – 55 min.
- Write your answers on the sheets provided.
- **Commence each new question on a new page**.
- Write using blue or black pen. Where diagrams are to be sketched, these may be done in pencil.
- NESA approved calculators may be used.
- All necessary working should be shown in every question. Marks may be deducted for illegible or incomplete working.
- Attempt **all** questions.
- At the conclusion of the examination, bundle any additional sheets used in the correct order within this paper and hand to examination supervisors.

Class (please ✔)

- ◯ 10MAT.N – Mr Wall
- ◯ 10MAT.B – Mrs Gan
- ◯ 10MAT.H – Mrs Bhamra
- ◯ 10MAT.S – Mr Tan/Mr Lam

NAME: ..... **# SHEET(S) USED**: .....

Marker's use only.

QUESTION	1	2	3	4	Total	%
MARKS	19/19	12/12	13/13	9/11	53/55	96

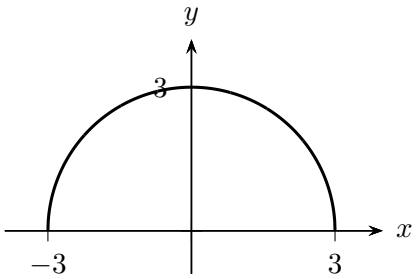
Question 1 (19 Marks) Commence a NEW page **Marks**

(a) For the following graphs:

i. State whether it is a function or a relation

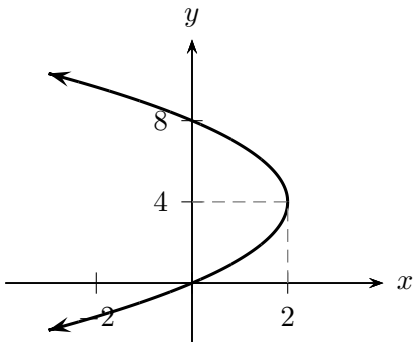
ii. Write down its domain and range.

(A)



3

(B)



3

(b) Given $g(x) = 3x^2 - 7x + 1$, find the value(s) of k if $g(k) = 7$. **2**

(c) For the function $f(x) = x^2 - 6x - 7$,

i. Find $f(-3)$. **1**

ii. Find $f(p+1)$. **2**

iii. Find the range. **2**

(d) For the following functions, draw their respective graphs on separate axes, at one-third of a page size. Show all intercepts clearly.

i. $y = -(x+1)^3$ **2**

ii. $y = x(x+2)(4-x)$ **2**

(e) Given $f(x) = x^2 + 5$, sketch the graph of **2**

$$y = f(x-2) + 3$$

Clearly label the vertex only.

Question 2 (12 Marks) Commence a NEW page **Marks**

(a) By using the quadratic formula, solve $3x^2 - 6x + 1 = 0$. **3**
Express the solutions in simplest surd form.

(b) A parabola has vertex at $V(1, -6)$ and cuts the x axis at $x = 2$ and $x = 4$. **3**

Find the equation of the parabola in the form $y = ax^2 + bx + c$.

(c) By completing the square, sketch the graph of **3**

$$y = x^2 - 6x + 11$$

Label the vertex and any x and y intercepts.

(d) Solve the following pair of simultaneous equations: **3**

$$\begin{cases} x + 2y = 3 \\ xy + 2x + y = 4 \end{cases}$$

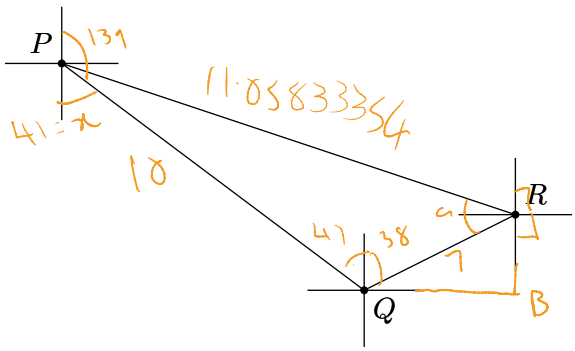
Question 3 (13 Marks) Commence a NEW page **Marks**

(a) Find the exact value of $\cos(-225°)$. **2**

(b) Given that $\tan\theta = -\dfrac{3}{2}$ and $90° \leq \theta \leq 180°$, find the exact value of $\sin\theta$. **2**

(c) Solve for θ: $\sin\theta = \dfrac{\sqrt{3}}{2}$, where $0° \leq \theta \leq 360°$. **2**

(d) A yacht sails 10 km from the point P to the point Q on a bearing of 139°T. It then sails 7 km from point Q to point R on a bearing of 38°T.



i. Copy or trace the diagram into your answer sheet, showing all of the given information. **1**

ii. Show that $\angle PQR = 79°$. **1**

iii. Find the distance PR, correct to 2 decimal places. **2**

iv. Find the bearing of P from R, correct to the nearest degree. **3**

Question 4 (11 Marks) Commence a NEW page **Marks**

(a) The profit of an accessory company which produces mobile phone cases is given by

$$P = -6x^2 + 60x - 54$$

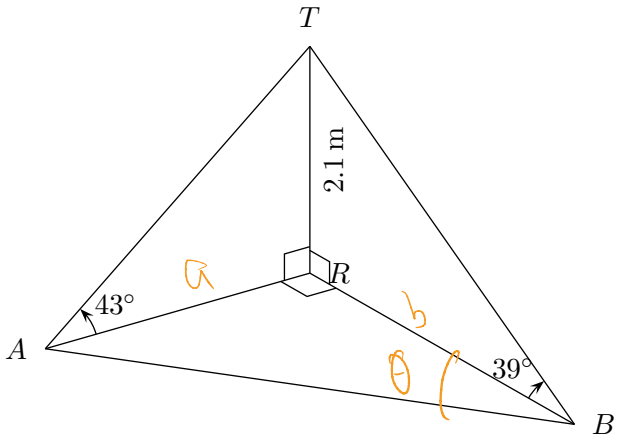
where P is the monthly profit in thousands of dollars, and x is the numer of cases, sold in hundreds.

i. Graph the quantity sold versus profit made. Label the vertex and the x intercepts. **3**

ii. What is the smallest number of cases sold in order to make a profit? **1**

iii. At what production level will maximum profit be generated? **1**

(b) A vertical tent pole TR measuring 2.1 m is secured by ropes in two different directions. The ropes are held by pegs at A and B at angles of elevation 43° and 39° respectively. The line from the base of the pole to peg A is at right angles to the line from the base of the pole to peg B.



i. Find the distance from the base of the tent pole to peg A and peg B respectively, correct to 2 decimal places. **2**

ii. Find the size of $\angle RBA$, correct to the nearest degree. **2**

iii. Find the distance between peg A and B, correct to 1 decimal place. **2**

End of paper.

2017 Stage 5.1-5.3 Mathematics (Year 10) Assessment Task 1 STUDENT SELF REFLECTION

1. In hindsight, did I do the best I can? Why or why not?

.....

.....

.....

2. Which topics did I need more help with, and what parts specifically?

- Q1(c)(e) - Basic Trig

.....

.....

.....

- Q1(a)(b) - Exact Values

.....

.....

.....

- Q1(d) - Trig Graphs

.....

.....

.....

- Q2(a) - Harder 2 triangle problems

.....

.....

.....

- Q2(b)(c) - Sine/cosine rule, area of triangle via sine rule

.....

.....

.....

- Q3 - Surds review

.....

.....

.....

- Q4 - Bearing and harder problem solving

.....

.....

.....

3. What other parts from the teacher feedback can I take away to refine my solutions for future reference?

.....

.....

.....

.....