BAULKHAM HILLS HIGH SCHOOL

YEAR 10 YEARLY MATHEMATICS October 2010

Time allowed: 70 minutes

Students Name:_____

Teacher's Name:_____

DIRECTIONS TO CANDIDATES

- Attempt ALL questions.
- Diagrams are not to scale unless specified.
- NO liquid paper/tape is to be used in the exam
- Write your teacher's name and your name on the cover sheet provided.
- At the end of the exam, staple your answers in order behind the cover sheet provided, and your questions on the back

QUESTION	MARK
1	
2	
3	
4	
5	
6	
7	
TOTAL	

Topics Tested: Trigonometry, Consumer Arithmetic, Probability, Measurement, Coordinate Geometry , Algebra, Problem Solving, Graphs, Statistics, Geometry, Circle Geometry, Polynomials

Question 1 (12 marks) **Marks**

a) Evaluate $\sqrt{\dfrac{3.74^4}{32.5 - 1.12^2}}$ correct to 2 decimal places **2**

b) Simplify $2y - y(3 - 4y)$ **1**

c) Solve $\dfrac{3x - 2}{5} = 2 + x$ **2**

d) Solve $(x + 5)(2x - 3) = 0$ **2**

e) Rationalise the denominator, leaving your answer in simplest form. **2**

$\dfrac{3\sqrt{5}}{\sqrt{8}}$

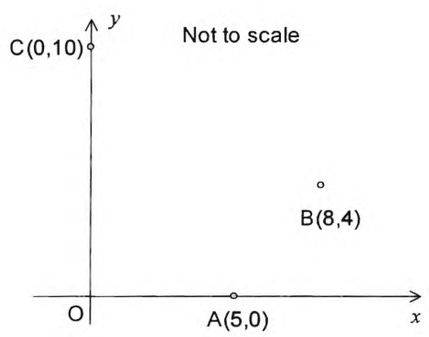
f) Given $f(x) = x^2 - 5$

i) find $f(2)$ **1**

ii) find $f(x + h)$. Simplify your answer. **2**

Question 2 (12 marks) - Start a new page

Given $A(5,0)$, $B(8,4)$ and $C(0,10)$



i) Find the gradient of AB **1**

ii) Find the length of AB **1**

iii) Show that the equation of the line AB is $4x - 3y - 20 = 0$ **2**

iv) Show that AB is perpendicular to BC **2**

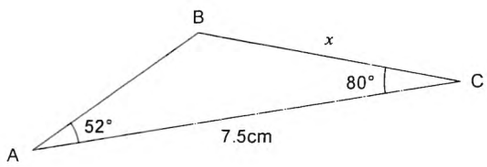
v) Show that $\Delta OAC \equiv \Delta ABC$ **3**

vi) Hence or otherwise, find the area of the quadrilateral $OABC$ **3**

Question 3 (12 marks) - Start a new page

a) A computer valued at \$2200 depreciates at a rate of 15% per annum. Find the value of the computer after 5 years. **2**

b) **2**



Find the value of x correct to 2 decimal places.

c) Find the axis of symmetry of the parabola $y = x^2 + x + 1$ **2**
Hence or otherwise, find the minimum value of $x^2 + x + 1$

d) A coin is tossed 3 times.

i) Draw a tree diagram **1**

ii) Find the probability of getting

α) 2 heads and 1 tail in any order **1**

β) only tails **1**

e) Simplify, giving your answers without negative indices. **2**

$$\frac{a^3b^{-1}}{(ab)^2}$$

f) Factorise completely $4x^2 - 16$ **1**

Question 4 (12 marks) - Start a new page

a) Solve $|3x - 2| = 5$ **2**

b) Thirty randomly chosen passengers at Sydney Airport were surveyed about the length of time in minutes, they spent waiting in line at the Customs.
The data is displayed in a stem and leaf plot.

Stem	Leaf
0	5 8 8 9
1	2 2 7 8 9
2	0 1 4 6 8
3	2 4 4 6 7 7 8 9 9
4	0 0 1 4 5 9 Δ

i) If the range of scores is 44, find the value of Δ **1**

ii) Find the median waiting time **1**

iii) Draw a box and whiskers plot of this data **2**

c) If the height of a smaller cone is half the height of a larger similar cone, what is the ratio of their volumes. **1**

d) Solve $2\cos\theta = 1$ for $0 \leq \theta \leq 360°$ **3**

e) Simplify $\sqrt{x^3} + \sqrt{x} - \sqrt{9x}$ **2**

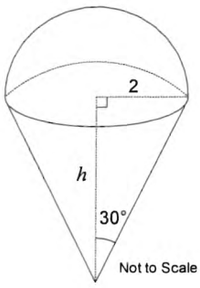
Question 5 (12 marks) - Start a new page **Marks**

a) Sketch the following, showing x and y intercepts and other important features

i) $y = \frac{3}{x-2} - 2$ **3**

ii) $x^2 + (y-2)^2 = 16$ **3**

b)



Note: This solid is formed by joining a cone and hemisphere.

i) Find the exact height of the cone. **2**

ii) Calculate the volume of the solid correct to 2 decimal places. **2**

c) For the following set of scores 17 27 37 40 28 35 37 20 , determine:-

i) the mean **1**

ii) the standard deviation **1**

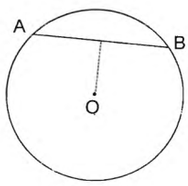
Question 6 (12 marks) - Start a new page **Marks**

a) Sketch the following region $y \leq \sqrt{9 - x^2}$ **2**

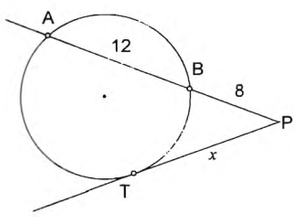
b) If $(x-2)(x+k) = x^2 + ax + 10$, find a and k. **2**

c) Answer the following. No reasons required

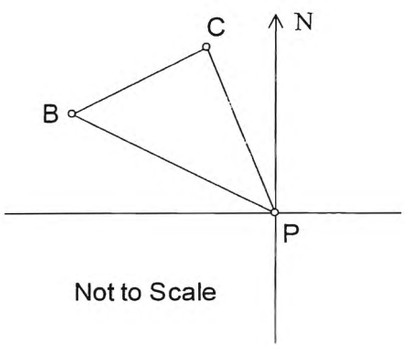
i) Given the radius r =5cm and the length of the chord $AB = 6cm$
Find the distance of O from the chord AB. **2**



ii) Find x **2**



d)



A ship leaves port and sails on a bearing of 305° for 200 km to get to point B
At B it changes course to 060° and sails for further 100km to get to point C.

i) How far is the ship west of the port at point B. **1**

ii) Find $\angle PBC$ **1**

iii) How far is C from the port? **2**

Question 7 (12 marks) - Start a new page **Marks**

a) Solve $4^x - 5(2^x) + 4 = 0$ **3**

b) Given that α is obtuse and $\sin\alpha = \frac{1}{\sqrt{5}}$, find the exact value of $\cos\alpha$ **2**

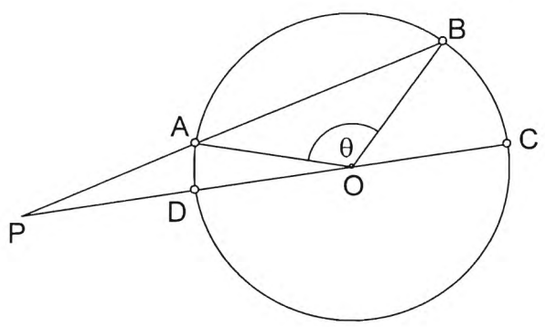
c) Given $P(x) = 2x^3 + x^2 - 5x + 2$ and $Q(x) = x + 2$

i) What is the remainder when $P(x)$ is divided by $Q(x)$? **1**

ii) Express $P(x)$ as a product of its factors **1**

iii) Hence or otherwise sketch $y = P(x)$ showing x and y-intercepts. **2**

d) Given is a circle with centre O and radius 2 units.
If $PD = 2\ units$ and $PA = AB$ show $\cos\theta = \frac{1}{4}$ **3**



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