TAYLOR'S UNIVERSITY COLLEGE
Wisdom · Integrity · Excellence

CAMBRIDGE 'A' LEVEL PROGRAMME
SEMESTER ONE EXAMINATION JUNE 2007
(March 07 Intake)

Thursday **14 June 2007** **1.30 pm – 3.30 pm**

MATHEMATICS 9709/1,6

2 hours

Additional materials: Answer Paper
List of formulae (MF9)
Graph Paper

READ THESE INSTRUCTIONS FIRST

Write your name and class on all the work you hand in.
Write in dark blue or black pen on both sides of the paper.
You may use a soft pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** the questions.
Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place in the case of angles in degrees, unless a different level of accuracy is specified in the question.
At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [ ] at the end of each question or part question.
The total marks for this paper is 80.
Questions carrying smaller numbers of marks are printed earlier in the paper, and questions carrying larger numbers of marks later in the paper.
The use of an electronic calculator is expected, where appropriate.
You are reminded of the need for clear presentation in your answers.

This document consists of 4 printed pages.

[Turn over

Section A: Pure Mathematics (P1)

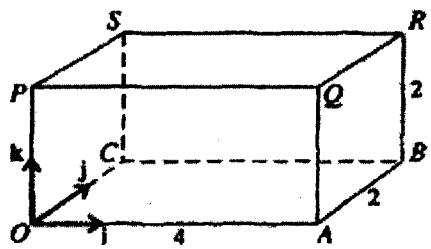
1. The line $8y = 3x + 7$ intersects the curve $3xy = 1$ at the points A and B. Find the coordinates of A and B. [4]

2. The gradient of a curve is given by $2x^2 - 8x$.
   a) Find the equation of the curve if the curve passes through the point (-2, 4). [4]
   b) Find the coordinates of the stationary point on the curve. [4]

3. A progression has a first term of 12 and a fifth term of 192.
   a) Find the 17th term if the progression is **arithmetic**. [2]
   b) Find the sum of the first 15 terms if the progression is **geometric** and **r >1**. [4]

4. a) Write and simplify the first 3 terms in the expansions of $(3+4x)^5$. [4]
   b) Hence or otherwise obtain the coefficient of x^2 in the expansion of $(2-x)(3+4x)^5$. [2]

5.



The diagram shows a cuboid OABCPQRS in which the length of OA is 4 units and the lengths of AB and BR are each 2 units. Unit vectors **i**, **j**, **k** are taken along the edges OA, OC, OP respectively.

   a) Express the vectors $\overrightarrow{OR}$ and $\overrightarrow{AS}$ in terms of **i**, **j** and **k**. [3]
   b) Find the angle OBS. [4]

6. The function $f: x \to x^2 - 4x + 3$, has domain $x \in \Re$ and $x > 2$.
   a) Determine the range of f. [1]
   b) Find the inverse function f^{-1} and state its domain and range. [6]
   c) Sketch in a single diagram, the graphs of $y = f(x)$ and $y = f^{-1}(x)$, making clear relationship between the two graphs. [2]

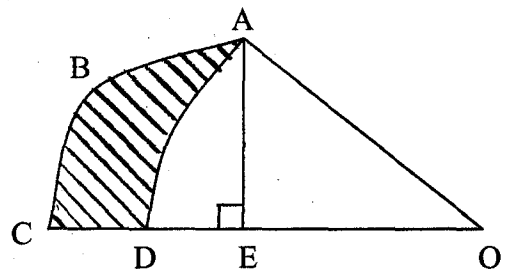
7. a) i) Evaluate $\int_1^2 x(x^2-2)dx$. [2]

ii) Find $\int 6(x+1)^{1/2}dx$. [3]

b) Find the volume of revolution, in terms of π, when the region bounded by curve $y=\frac{1}{2}x^3+2$, the x-axis, the lines $x=-1$ and $x=2$ is rotated completely about x-axis. [5]

8. Solve the equation $4\sin^2 2\theta\cos 2\theta = \tan^2 2\theta$, giving all the solutions in the interval $0^0 \le \theta \le 360^0$. State your answers in **1 decimal place.** [7]

9.



AOD is a circular sector with centre O and ABCE is a quadrant with centre E as shown in the diagram above. Given that OD = 10cm, EC = 8 cm and the arc length of AD = 9 cm.

a) Show that $\angle AOE$ is 0.9 rad. [2]

b) Find the area of the shaded region. [7]

Section B: Statistics (S1)

10. A chicken farmer fed 25 new-born chicks with a new variety of corn. The data summarised as $\sum(x-400)=192$ and $\sum(x-400)^2=11894$, where x is the weight gain of a chick in grams.

a) Calculate the mean and standard deviation of the weight gains of the 25 chicks, giving each answer to the nearest gram. [4]

b) Chicks fed on the standard variety of corn had weight gains after three weeks with mean 392 grams and standard deviation 12 grams. State briefly how the new variety of corn compares to the standard variety. [2]

11. The table below shows the duration of telephone calls (in minutes) in an office for 50 calls on Monday.

Duration of calls (minutes)	**Number of calls**
0 - 1	7
1 – 2	12
2 – 3	18
3 – 4	7
4 - 5	5
5 - 6	1

a) Draw a cumulative frequency graph and estimate the **median** and **interquartile range**. [6]

b) Construct a Box-and-whisker plot. [2]