

XAVIER HIGH SCHOOL
MATHEMATICS DEPARTMENT

YEAR 11 PRELIMINARY COURSE

May 2008

EXTENSION 1

MATHEMATICS

Extension 1

Time allowed – One hour
(Plus 5 minutes reading time)

DIRECTIONS TO CANDIDATES

- ALL questions may be attempted.
- ALL questions are of equal value.
- All necessary working should be shown in every question. Full marks may not be awarded for careless or badly arranged work.
- Approved calculators may be used.
- Each question must be answered on a new sheet of paper and must clearly show your **student number**.
- **In Question 3, please answer the circle geometry questions in the space provided on the examination paper.**

QUESTION 1. (Please start a new page.)

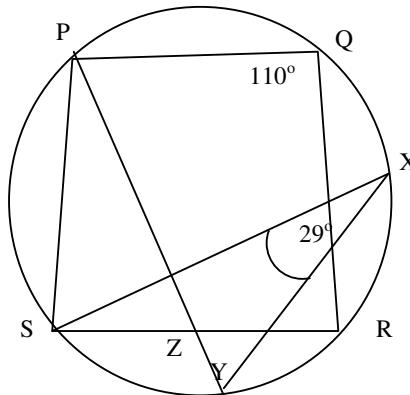
		Marks
a.	Divide the interval joining A(-2, -1) and B (1, 5) externally in the ratio 2: 5	2
b.	Simplify $1 - (1 - k)^2$	1
c.	Factorise completely: (i) $m^4 - 1$ (ii) $n^4 - n$	2
d.	Solve $ 2x + 1 \geq 5$	2
e.	Solve $\frac{x}{x - 3} \geq 2$	3

QUESTION 2. (Please start a new page.)

a.	Simplify $\sin(x + y) + \sin(x - y)$	2
b.	If $\cos A = \frac{2}{3}$, what are the values of: (i) $\sin^2 A$ (ii) $\cot^2 A$	2
c.	By writing 15° as $45^\circ - 30^\circ$ show that $\sin 15^\circ = \frac{\sqrt{6} - \sqrt{2}}{4}$	2
d.	Prove that $\frac{1 - \cos 2A}{\sin 2A} = \tan A$	2
e.	Prove that $\sin 2A = (\sin A + \cos A)^2 - 1$	2
f.	If $t = \tan \frac{\theta}{2}$ express $\cosec \theta + \cot \theta$ in terms of t	2

QUESTION 3. (Please start a new page.)

	Marks
a. Solve: (i) $\tan x = 1$ for $0^\circ \leq x \leq 360^\circ$	2
(ii) $\cos x(2\sin x + 1) = 0$ for $0^\circ \leq x \leq 360^\circ$	2
b. PQRS is a cyclic quadrilateral. X and Y are two points on the circle. Point Z is the intersection of PY and SR. $\angle SXY = 29^\circ$ and $\angle PQR = 110^\circ$. Find the size of $\angle SZP$, giving reasons for your answer.	



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QUESTION 3. (Continued)**Marks**

c. The points P, Q, S and T lie on the circumference of a circle. SQ is a diameter of the circle and $TP \parallel SQ$. $\angle PSQ = x^\circ$

Find an expression for $\angle TSP$ in terms of x .

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