Name: _____

Class Teacher (*circle*): KM AM GP DL

YEAR 11 MATHEMATICS

Preliminary Assessment Task 1

March 2007

Arithmetic, Algebra, Functions and Relations

Syllabus Topics to be covered in this task:	1.1, 1.2, 1.3, 1.4 4.1, 4.2, 4.3 (not locus), 4.4
Syllabus Outcomes to be addressed in this task:	P3, P4, P5 PE1, PE2, PE3, PE6

- Time allowed: 50 minutes
- There are three questions, each worth 14 marks
- The mark value of each part is indicated in [**…**] next to that part
- Start each question on a new page

Question 1: Start a new page [14 marks]

(a) Simplify $8x-11-4(x-5)$ **[2]**

(b) Evaluate $k=\sqrt{\dfrac{4.809\times10^4}{(2.003)^3}}$. Write your answer correct to 3 significant figures. **[2]**

(c) Write $0.4\dot{8}$ as a simplified fraction. **[2]**

(d) Factorise completely:

(i) x^3+5x^2-6x **[2]**

(ii) $ax-bx+ay-by$ **[2]**

(iii) x^3+27 **[1]**

(e) Simplify $\sqrt{56}-\sqrt{2}+\sqrt{18}$ **[2]**

(f) Write $5\sqrt{2}$ as a single surd. **[1]**

Question 2: Start a new page [14 marks]

(a) If $\frac{1-\sqrt{5}}{1+\sqrt{5}} = a + b\sqrt{5}$ find a and b. **[2]**

(b) Simplify fully $\frac{x}{3+x} - \frac{5+x}{9-x^2}$ **[3]**

(c) Solve simultaneously: **[2]**

$$\left.\begin{aligned} x + 2y &= 4 \\ 2x - y &= 8 \end{aligned}\right\}$$

(d) Factorise fully $x^2 - 8x + 16 - y^2$ **[2]**

(e) Solve $3x^2 - 19x - 14 \le 0$ **[2]**

(f) A function is defined by the following:

$$f(x) = \begin{cases} x^2 & for \quad x < -4 \\ 4 & for \quad -4 \le x < 2 \\ 2x & for \quad x \ge 2 \end{cases}$$

Neatly sketch $y = f(x)$ showing all its features. **[3]**

Question 3: Start a new page [14 marks]

(a) State the domain and range for the curve $y = \dfrac{2}{3-x}$ **[2]**

(b) Given $f(x) = x - \dfrac{1}{x}$:

(i) Show that $f\left(\dfrac{1}{2}\right) = f(-2)$ **[2]**

(ii) Find k given that $f(k) = 0$ **[2]**

(iii) Find $f(-x)$ **[1]**

(c) (i) Given $x^2 - 10x + y^2 + 2y + 22 = 0$, **by completing the square**, show that

$$(x-5)^2 + (y+1)^2 = 4$$ **[2]**

(ii) Sketch the graph of $(x-5)^2 + (y+1)^2 = 4$, showing all essential features. **[2]**

(iii) State the **domain** for $(x-5)^2 + (y+1)^2 = 4$. **[1]**

(iv) For what value(s) of a will $(x-5)^2 + (y+1)^2 = 4$ and $y = a$ have no solutions? Explain your answer. **[2]**

End of Assessment Task