



**Year 11 Mathematics Extension 1
Preliminary ASSESSMENT TASK 2
TERM 1, Week 8, 2004**

Name: _____

Teacher: _____

Set By: IM

Wednesday 17 March 2004

- Attempt **ALL** questions. Begin each question on a new sheet of paper.
- Only Board approved calculators (**excluding** graphic calculators) may be used.
- Total possible mark is **34**. Marks may be deducted for insufficient or illegible work.
- **TIME ALLOWED:** 45 minutes

Question 1:

(5 marks)

Given $f(x) = x^2 + 3x$ find, in simplest form:

- (a) $f(1-a)$ 2
- (b) $\frac{f(x+h) - f(x)}{h}$ 3

Question 2: *Begin a new sheet of paper*

(6 marks)

Sketch the graphs of the following functions indicating any intercepts and asymptotes.

- (a) $y = 3^x + 1$ 3
- (b) $y = \log_{10}(x-1)$ 3

Question 3: *Begin a new sheet of paper*

(7 marks)

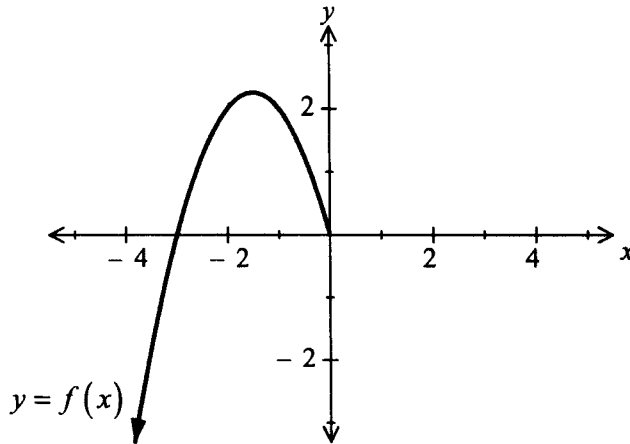
- (a) (i) State the domain and range of $y = \sqrt{1-x}$. 2
- (ii) Sketch, on a number plane, the graph of $y = \sqrt{1-x}$, showing the coordinates of the x intercept. 2
- (b) Sketch the region in the number plane satisfying the following pair of inequalities: 3

$$x^2 + (y-4)^2 \leq 16 \quad \text{and} \quad y \geq 4 - x^2$$

Question 4: Begin a new sheet of paper

(6 marks)

- (a) Copy and then complete the graph of $y = f(x)$ below so that it is an even function. **1**



- (b) Prove that $f(x) = x^3 - x$ is an odd function. **2**
- (c) Solve for x if: $|4 - x^2| = 2$ **3**

Question 5: Begin a new sheet of paper

(5 marks)

Consider the function $y = \frac{x+1}{x-2}$.

- (a) For what value of x is $y = \frac{x+1}{x-2}$ undefined? **1**
- (b) Determine the equation of the horizontal asymptote. **1**
- (c) Sketch the graph of $y = \frac{x+1}{x-2}$ labelling clearly any important features. **3**

Question 6 commences on the next page ...

Question 6: *Begin a new sheet of paper*

(5 marks)

(a) (i) On the same set of axes, sketch the graphs of: 2

$$(\alpha) \quad y = |x - 2| \quad \text{and} \quad (\beta) \quad y = 4 - x$$

(ii) Hence or otherwise solve:

$$(\alpha) \quad |x - 2| = 4 - x \quad \text{1}$$

$$(\beta) \quad |x - 2| \geq 4 - x \quad \text{1}$$

(b) Find the value(s) of a such that $|x - 2| = a - x$ has no solutions. 1

END OF TASK