

**MATH1003
ASSIGNMENT 1**

Suggested practice questions (the answers are in the back of the textbook):

- §2.2; 5, 7, 13, 25.
- §2.3; 1, 5, 23.

1. Let $f(x) = \frac{x}{x+1}$. Find:

(i) $f(2+h)$

(ii) $f(x+h)$

(iii) $\frac{f(x+h) - f(x)}{h}$, where $h \neq 0$.

2. Find the domain of the function

$$f(x) = \frac{5x+4}{x^2+3x+2}.$$

3. Find the domain and sketch the graph of the following functions:

(i) $H(t) = \frac{4-t^2}{2-t}$

(ii) $g(x) = \frac{|x|}{x^2}$

(iii) $f(x) = \begin{cases} 2x+3, & \text{when } x < -1; \\ 3-x, & \text{when } x \geq -1. \end{cases}$

4. Calculate the limit, if it exists, of the following:

(i) $\lim_{x \rightarrow 2} \frac{x^4 - 16}{x - 2}$

(ii) $\lim_{x \rightarrow 5^-} \frac{6}{x - 5}$

(iii) $\lim_{x \rightarrow 0} \frac{x-1}{x^2(x+2)}$.