MATH6014: Test 2

Name:
Student Number:

Answer all questions. Marks may be lost if necessary work is not clearly shown.

1. *Show that* $(x-2)$ *is a factor of* $f(x) = 2x^3 + x^2 - 8x - 4$. *Hence find all the roots of* $f(x)$.

(10 marks)

2. *Express the following as the sum of two partial fractions:*

$$\frac{2x+18}{(x-3)(x+3)}$$

(5 marks)

3. *Solve the system of simultaneous equations*

$$\begin{aligned} 2x - 3y + z &= -2 \\ 5x - y + 2z &= 3 \\ 3x + 2y - z &= 11 \end{aligned}$$

(10 marks)

4. *Express in linear form.*

   (i) $y = ax + \frac{1}{2}bx^2$.

   (ii) $y = ax^b$.

(5 marks)

5. *Please find all solutions in the range* $0^\circ \leq x \leq 180^\circ$*, of the trigonometric equation*

$$\cos 3x = 0.$$

(5 marks)

6. *Consider the waveform defined for* $t \geq 0$*:*

$$x(t) = 3\sin(4t + \pi/8)$$

(i) What is the amplitude?

(ii) What is the period?

(iii) When is $x(t)$ *first at a maximum?*

(5 marks)