1. Find the following limits. Show your work.

(a)
$$\lim_{x \to 1} \sqrt{x^2 - x + 1}$$

(b)
$$\lim_{x \to 0^+} \frac{|x|}{x}$$

(c)
$$\lim_{x \to 0} \frac{\sin(x^2)}{x}$$

2. Are the following functions continuous? Justify your response.

(a)
$$x^4 + 2x^2 + 5$$
 over \mathbb{R}

(b)
$$\frac{1}{1+x}$$
 on the interval $[0,2]$

(c)
$$\frac{1}{1+x}$$
 on the interval $(1,2]$

(d)
$$\frac{|2x+3|}{2x+3}$$
 over \mathbb{R}

3. Find the derivative of $f(x) = 6x^2 + x - 10$ using the formal definition of the derivative.

4. Find the derivative of the functions. Show your work.

(a)
$$f(x) = \frac{1}{x^{2/3}}$$

(b)
$$f(x) = e^{x^2+1} + x \log(x+3)$$

(c)
$$f(x) = \frac{x+1}{x^2+2x+5}$$

5. Find the maximum and minimum points of f(x) on the interval [-2, -1/4].

$$f(x) = \frac{(x-1)^3}{x}$$

(Hint: The roots of the polynomial $2x^3 - 3x^2 + 1$ are 1 and -1/2.)