The third test is in class on Friday 21 October.

Here are some sample questions, so that you have an idea of what to expect.

1. Let $f(x) = x^2 - 3$.

    (a) Using the definition of the derivative as a limit, compute $f'(x)$.

    (b) Find the equation for the tangent line at $x = 2$.

    (c) Graph $f(x)$ and the tangent line.

2. Compute the following derivatives:

    (a) $f(x) = \sin(x) \Rightarrow f'(x) =$

    (b) $f(x) = \sin(3) \Rightarrow f'(x) =$

    (c) $f(x) = \cos(x) \Rightarrow f'(x) =$

    (d) $f(x) = \tan(x) \Rightarrow f'(x) =$

    (e) $f(x) = e^x \Rightarrow f'(x) =$

    (f) $f(x) = 3^x \Rightarrow f'(x) =$

    (g) $f(x) = x^3 \Rightarrow f'(x) =$

    (h) $f(x) = 2 + x + \dfrac{3}{x} - \sqrt{x} - 5x^7 + x^{3/4} \Rightarrow f'(x) =$

    (i) $y = \dfrac{x^3 + x}{x} \Rightarrow \dfrac{dy}{dx} =$

    (j) $D_x\left[(x^9 + x^8 + x^5 + 3)(1 + 2x^2 + 9x^3 - 4x^4)\right] =$

    (k) $\dfrac{d}{dx}\left[(x^9 + 2x^{1/3} + x^5 + 3)^4\right] =$

    (l) $\dfrac{d}{dx}\left[5\tan(x^2\sin(3^x + 7x))\right] =$

    (m) $D_x\left[\left((x^9 + x^8 + x^5 + 3)(1 + 2x^2 + x^3 - 4x^4) + 1\right)^9\right] =$

3. Find values for m and b so that $f(x) = \begin{cases} x^2 & \text{if } x \le -2 \\ mx + b & \text{if } x > -2 \end{cases}$ is differentiable at $x = -2$.