

8) Find an equation of the tangent line to the graph of f at the point – use your calculator to confirm the result.

a) $f(x) = 3x^3 - 2x^2 - x + 2$ at $(1, 2)$ point

b) $f(x) = (x^2 - 4x + 2)(4x - 1)$ at $(1, -3)$

$$f'(x) = 9x^2 - 4x - 1$$

$$f'(1) = 9(1)^2 - 4(1) - 1$$

$$f'(1) = 4 = m$$

$$y - 2 = 4(x - 1)$$

$$y - 2 = 4x - 4$$

$$\boxed{y = 4x - 2}$$

c) $f(x) = \frac{8}{x} - \frac{8}{x^2}$ at $(-2, -6)$

d) $f(x) = \frac{x-4}{x^2+4}$ at $(2, \frac{-1}{4})$

9) Find an equation of the line normal to the graph of f at the point – use your calculator to confirm the result.

a) $f(x) = x^3 - 4x^2$ at $(3, -9)$ point

b) $f(x) = \frac{-6}{\sqrt{x+1}}$ at $(4, -2)$

$$f'(x) = 3x^2 - 8x$$

$$f'(3) = 3(3)^2 - 8(3)$$

$$f'(3) = 3$$

slope of normal
 $m = -\frac{1}{3}$

$$y - (-9) = -\frac{1}{3}(x - 3)$$

$$y + 9 = -\frac{1}{3}x + 1$$

$$\boxed{y = -\frac{1}{3}x - 8}$$

10) Determine the points at which the graphs of the following functions have horizontal tangents.

a) $f(x) = x^2 + 2x - 24$

b) $f(x) = x^4 - 4x^2$

Slope = 0

$$f'(x) = 2x + 2$$

$$2x + 2 = 0$$

$$2(x+1) = 0$$

$$x+1 = 0$$

$$\boxed{x = -1}$$

c) $f(x) = \frac{x^2 - 3}{x^2 + 1}$

d) $f(x) = \frac{x-1}{x^2+3}$