

MATH1100 – QUIZ 2

NAME:

1. (5 points) Find the derivative $f'(x)$ of the function $f(x) = x^2 - 4$

using the definition $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$

$$f'(x) = \lim_{h \rightarrow 0} \frac{(x+h)^2 - 4 - (x^2 - 4)}{h} = \lim_{h \rightarrow 0} \frac{x^2 + 2xh + h^2 - 4 - x^2 + 4}{h}$$

$$\lim_{h \rightarrow 0} 2x + h = \underline{\underline{2x}}$$

2. (5 points each) Find the derivative:

a). $f(x) = x^5 - 3x^2 + 5x - 3$

$$f'(x) = 5x^4 - 6x + 5$$

$$g(x) = 4\sqrt{x} + \frac{1}{x} - \frac{1}{\sqrt[3]{x}} = 4x^{1/2} + x^{-1} - x^{-1/3}$$

$$g'(x) = 2x^{-1/2} - x^{-2} + \frac{1}{3}x^{-4/3}$$

3. (5 points) Find the slope of the tangent line to the graph of the function $f(x) = x^3 + x$ when $x = 1$.

$$f'(x) = 3x^2 + 1$$

$$f'(1) = 3 + 1 = 4 \equiv \text{slope of tangent line}$$