

Quiz #1

1. If $f(x) = 8x - 3x^2$, determine the following:

$$\begin{aligned}
 [3] \text{ a. } \frac{f(x+h) - f(x)}{h} &= \frac{8(x+h) - 3(x+h)^2 - (8x - 3x^2)}{h} \\
 &= \frac{\cancel{8x} + 8h - \cancel{3x^2} - 6xh - 3h^2 - \cancel{8x} + \cancel{3x^2}}{h} \\
 &= \frac{h(8 - 6x - 3h)}{h} = \boxed{8 - 6x - 3h}
 \end{aligned}$$

$$\begin{aligned}
 [3] \text{ b. } \frac{f(x) - f(a)}{x - a} &= \frac{(8x - 3x^2) - (8a - 3a^2)}{x - a} \\
 &= \frac{8(x-a) - 3(x^2 - a^2)}{(x-a)} = \frac{(x-a)[8 - 3(x+a)]}{(x-a)} \\
 &= 8 - 3x - 3a
 \end{aligned}$$

2. Let $f(x) = \frac{\sqrt{10-2x}}{x+2}$.

[1] a. Evaluate $f(3)$. $= \frac{\sqrt{10-6}}{5} = \frac{\sqrt{4}}{5} = \frac{2}{5}$

[3] b. Determine the domain of $f(x)$.

$$10 - 2x \geq 0 \Rightarrow -2x \geq -10 \Rightarrow x \leq 5$$

$$\text{and } x + 2 \neq 0 \Rightarrow x \neq -2$$

$$\text{Ans: } (-\infty, -2) \cup (-2, 5]$$