

FRQ notes (p. 31)

9/26/18

$$\#2 \quad f(x) = \sqrt{1 - \sin x} = (1 - \sin x)^{\frac{1}{2}}$$

a) $1 - \sin x \geq 0$

$$-\sin x \geq -1$$

$\sin x \leq 1$
all real #'s

b) $f'(x) = \frac{1}{2} (1 - \sin x)^{-\frac{1}{2}} \cdot (-\cos x) = \frac{-\cos x}{2\sqrt{1 - \sin x}}$

c) $2\sqrt{1 - \sin x} \neq 0$

$$\sqrt{1 - \sin x} \neq 0$$

$$1 - \sin x \neq 0$$

$$-\sin x \neq -1$$

$$\sin x \neq 1$$

$$x \neq \dots, \frac{\pi}{2}, \frac{5\pi}{2}, \frac{9\pi}{2}, \dots$$

$$x \neq \frac{\pi}{2} + 2\pi k, \text{ k is an integer}$$

d) point $(0, 1)$

$$\text{slope } f'(0) = \frac{-\cos(0)}{2\sqrt{1 - \sin(0)}} = \frac{-1}{2}$$

$$y - 1 = -\frac{1}{2}(x - 0) \quad y = -\frac{1}{2}x + 1$$

$$\#5 \quad f(a+b) - f(a) = kab + 2b^2$$

$$a) \quad f(1+2) - f(1) = k(1)(2) + 2(2)^2$$

$$21 - 5 = 2k + 8$$

$$16 = 2k + 8$$

$$8 = 2k$$

$$k = 4$$

$$b) \quad \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

$$f'(3) = \lim_{h \rightarrow 0} \frac{f(3+h) - f(3)}{h} = \lim_{h \rightarrow 0} \frac{4(3+h) + 2h^2}{h}$$

$$= \lim_{h \rightarrow 0} (12 + 2h) = \boxed{12}$$

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

$$= \lim_{h \rightarrow 0} (4x + 2h) = \boxed{4x}$$

$$f'(x) = 4x$$

$$f(x) = 2x^2 + C \leftarrow \text{a constant}$$

$$f(1) = 5 \quad f(3) = 21$$

$$\checkmark \\ C = 3$$

$$\boxed{f(x) = 2x^2 + 3}$$