Quiz 1 Solution

1. $$\text{slope} = \lim_{h\to 0}\frac{f(1+h)-f(1)}{h} = \lim\frac{[3\cdot(1+h)^2+2016]-[3\cdot 1^2+2016]}{h}$$

$$= \lim_{h\to 0}\frac{3\cdot[(1+h)^2-1^2]}{h} = \lim_{h\to 0}\frac{3\cdot[1+2h+h^2-1]}{h}$$

$$= \lim_{h\to 0}\frac{3\cdot(2h+h^2)}{h} = \lim_{h\to 0} 3\cdot(2+h) = 6$$

2. $$\lim_{x\to 0}\frac{1-\sqrt{1-x^2}}{x} = \lim_{x\to 0}\frac{(1-\sqrt{1-x^2})\cdot(1+\sqrt{1-x^2})}{x\cdot(1+\sqrt{1-x^2})}$$

$$= \lim_{x\to 0}\frac{1-(1-x^2)}{x\cdot(1+\sqrt{1-x^2})} = \lim_{x\to 0}\frac{x^2}{x\cdot(1+\sqrt{1-x^2})}$$

$$= \lim_{x\to 0}\frac{x}{1+\sqrt{1-x^2}} = \frac{0}{2} = 0.$$