Check-up 3: Tangent lines with the Difference Quotient

Find the slope of the tangent line using the 1st difference quotient, $\lim\limits_{x \to a} \dfrac{f(x)-f(a)}{x-a}$

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

Find the equation of the tangent line using the 1st difference quotient, $\lim\limits_{x \to a} \dfrac{f(x)-f(a)}{x-a}$

2. $f(x) = \dfrac{2}{x-1}$ at $x = 5$

Find the slope of the tangent line using the 2nd difference quotient, $\lim\limits_{h \to 0} \dfrac{f(x+h)-f(x)}{h}$

3. $f(x) = \sqrt{x + 4}$ at $x = 16$

Find the equation of the tangent line using the 2nd difference quotient, $\lim\limits_{h \to 0} \dfrac{f(x+h)-f(x)}{h}$

4. $f(x) = \sin(x)$ at $x = \dfrac{\pi}{2}$

Find the equation of the tangent line using the 2nd difference quotient, $\lim\limits_{h \to 0} \dfrac{f(x+h)-f(x)}{h}$

5. $f(x) = \cos(x)$ at $x = \pi$