

Who loves them some trig?! Key _____ Period: _____

AP Calculus AB: 3.8 Derivatives of Simple Trig Functions

Find the derivative of each of the following functions.

1) $y = \sin(x) + \tan(x) - e^{2x}$

$$y' = \cos(x) + \sec^2(x) - 2e^{2x}$$

2) $y = 2 \cot(x) + \sec(x) + \ln(x)$

$$y' = -2 \csc^2(x) + \sec(x) \tan(x) + \frac{1}{x}$$

3) If $g(x) = \sec(x)$ then find $f'(\frac{2\pi}{3})$

$$f'(\frac{2\pi}{3}) = 2\sqrt{3}$$

4) Find $f'(x)$ if $f(x) = \frac{2}{5x^3} - \sin(x)$

$$f'(x) = \frac{-6}{5x^4} - \cos(x)$$

5) Find the x-value where the tangent line of the function $g(x) = \tan(x)$ has a slope of $m=2$.

$$g'(x) = 2$$

$$\sec^2(x) = 2$$

$$\sec(x) = \sqrt{2}$$

$$x = \frac{\pi}{4} \text{ and } \frac{7\pi}{4}$$

remember there are two answers in the 4 quadrants

6) Determine the instantaneous rate of change of the function $h(t) = 4t + \frac{\cos(t)}{2}$ at $t = 0$

$$h'(0) = 4$$

7) Evaluate $\lim_{h \rightarrow 0} \frac{5 \csc(x+h) + 2(x+h) - 1 - (5 \csc(x) + 2x - 1)}{h}$

$$-5 \csc(x) \cot(x) + 2$$

8) For the functions $f(x) = 5 - x$ and $g(x) = \cos(x)$, where do the graphs of f and g have parallel tangent lines?

$$f'(x) = g'(x)$$

$$-1 = -\sin(x)$$

$$1 = \sin(x)$$

$$x = \frac{\pi}{2}$$