

Name _____

Justify all answers by showing your work or by providing a coherent explanation. Please circle your answers.

1. a) $\frac{d}{dx}(x^4 - 9\sin x + 2\tan x) =$

b) $\frac{d}{dz}\left(\frac{2}{z} - \frac{2z^3}{3} - \frac{\pi^2}{e}\right) =$

c) $(8 \csc w \sec w)' =$

d) $(6\sqrt{x^3} - 2x^2 \sin x)' =$

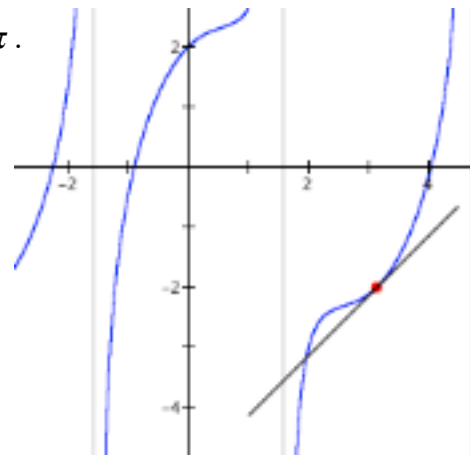
e) $\left. \frac{d}{dx} \left(6 + 4\sqrt{x} \csc x \right) \right|_{x = \frac{\pi}{4}} =$

f) $\frac{d}{dt}(6t \cot t - 4e^t) =$

g) $\frac{d}{dv}\left(\tan v + \frac{1}{2}v^2 \ln v\right) =$

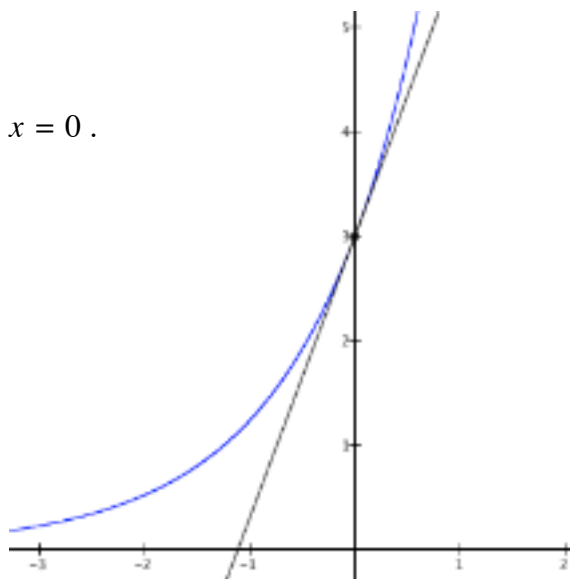
h) $\frac{d}{dx}\left(\frac{e^x + e^{-x}}{2}\right) =$

2. Find the slope of the tangent line to $f(x) = \tan x + 2 \cos x$ at $x = \pi$.



3. The position of an object is given by $s(t) = \frac{\pi \cos t}{1 - \cos t}$. Determine all the points where the object is not moving on the interval $(0, 2\pi)$.

4. Find the equation of the tangent line to $f(x) = 2^x + 2e^x$ at $x = 0$.



5. a) Find $\lim_{x \rightarrow 0} \frac{e^{2x} - 1}{e^x - 1}$. (Remember $e^{2x} = e^x \cdot e^x$)

b) Find $\left. \frac{d^2}{dx^2} \right|_{x=1} (e^x \ln x) =$.