

Quiz – Limits and Derivatives of Exponential, Logarithmic and Trig Functions

Name: _____

Answer the following questions on your own paper. Full value will only be given if work is shown.

1. Evaluate the following limits. If the limit does not exist and is not infinite, write “DNE”. You may use L’Hospital’s Rule where appropriate. *Justify your answers.*

a) $\lim_{x \rightarrow \frac{\pi}{6}} (\sin x + \cos x)$

b) $\lim_{x \rightarrow \pi} \frac{\cos^2 x}{\pi - x}$

d) $\lim_{x \rightarrow 0} \frac{\pi \sin 5x}{3x}$

e) $\lim_{x \rightarrow \infty} \frac{x^2 + 3x + 1}{x \ln x}$

2. Differentiate. *Do not simplify.*

a) $g(x) = \frac{x^2 - 6 \tan x}{1 + \csc 5x}$

b) $h(x) = [2 \ln(x - 1) + 3\sqrt{x}]^4$

c) $m(x) = 9e^{\cos x}$

d) $f(x) = \frac{2}{7} \log_5(\sin x)$

e) $n(x) = -3 \csc(2x^2 - 5x + 11)$

f) $f(x) = (12x^2 - 6x + \ln 2)e^{7-2x}$

g) $h(x) = \ln[\sin(3x + 4)]^6$

h) $m(x) = 5x \cdot \sec(\log_7 x)$

i) $n(x) = \frac{10}{x} - x^2 \cot(x)$

j) $g(x) = 8^{(\tan x + \log_2 x)}$

3. Use implicit differentiation to find y' .

$$\pi x^2 + \sin y = \sec x - 11x^3 y^8$$

4. Write the equation of the tangent line to the curve given below at $x = \frac{\pi}{3}$.

$$y = \sin^3 x$$

5. Use logarithmic differentiation to find y' .

$$y = \frac{e^{\sqrt{x}}(4x^6 - 7)^3}{\cos^4 x}$$