

# Math 131 - Quiz 8

April 1, 2026

Name key

Score \_\_\_\_\_

Show all work to receive credit. Supply explanations where necessary.

1. (5 points) Let  $f(x) = \tan^{-1}(e^x)$ .

(a) Find  $f'(x)$ .

$$f'(x) = \frac{1}{1+(e^x)^2} \cdot e^x = \boxed{\frac{e^x}{1+e^{2x}}}$$

(b) Find an equation of the line tangent to the graph of  $f$  at the point where  $x = 0$ .  
(Use exact numbers not decimal approximations.)

POINT:  $x = 0$

$$y = f(0) = \tan^{-1}(1) = \frac{\pi}{4}$$

Slope:  $f'(0) = \frac{1}{2}$

TANGENT LINE:

$$y - \frac{\pi}{4} = \frac{1}{2}(x - 0)$$

or

$$\boxed{y = \frac{1}{2}x + \frac{\pi}{4}}$$

2. (3 points) Let  $g(x) = 2x^3 + x - 10$ . Compute  $(g^{-1})'(8)$ .

$$(g^{-1})'(8) = \frac{1}{g'(g^{-1}(8))} = \frac{1}{g'(2)} = \boxed{\frac{1}{25}}$$

$$g^{-1}(8) = x$$

$$g(x) = 8 \quad 2x^3 + x - 10 = 8 \Rightarrow x = 2$$

$$g'(x) = 6x^2 + 1$$

$$g'(2) = 25$$

3. (2 points) Find  $dy/dx$  when  $y = xe^{x^2+4}$ .

$$\frac{dy}{dx} = e^{x^2+4} + xe^{x^2+4}(2x)$$

$$= \boxed{(1 + 2x^2)e^{x^2+4}}$$