

# Math 131 - Quiz 8

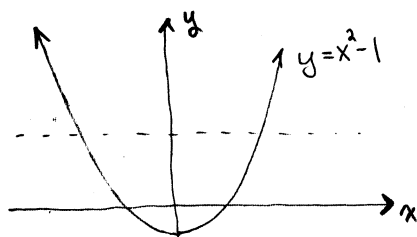
October 23, 2025

Name key

Score \_\_\_\_\_

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

1. (2 points) Explain why  $f(x) = x^2 - 1$  does not have an inverse.



$f$  IS NOT A ONE-TO-ONE FUNCTION.

ITS GRAPH FAILS THE HORIZONTAL  
LINE TEST.

2. (4 points) Let  $g(x) = x^3 + 5x + 8$ . Compute  $(g^{-1})'(2)$ .

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

$$g'(x) = 3x^2 + 5$$

$$g^{-1}(a) = x \Leftrightarrow x^3 + 5x + 8 = a$$

$$\Leftrightarrow x^3 + 5x = -6$$

$$\Leftrightarrow x = -1$$

$$g^{-1}(a) = -1$$

3. (4 points) Determine the derivative of each function.

(a)  $f(x) = \sin^{-1}(\sqrt{x})$

$$f'(x) = \frac{1}{\sqrt{1-(\sqrt{x})^2}} \cdot \frac{d}{dx} \sqrt{x} = \frac{1}{\sqrt{1-x}} \left( \frac{1}{2} x^{-1/2} \right) = \boxed{\frac{1}{2\sqrt{x}\sqrt{1-x}}}$$

(b)  $y = x \tan^{-1}(x^2)$

PRODUCT RULE...

$$\frac{dy}{dx} = \tan^{-1}(x^2) + x \left( \frac{1}{1+(x^2)^2} \right) (2x)$$

$$= \boxed{\tan^{-1}(x^2) + \frac{2x^2}{1+x^4}}$$