

## MATH 141 WORKSHEET 4

Show all work for full credit.

1. Use the limit definition of the derivative to find  $f'(x)$  for

$$f(x) = \frac{1}{x^2}$$

2. Use the limit definition of the derivative to find  $f'(x)$  for

$$f(x) = \sqrt{x}$$

2

3. Find the derivative  $f'(x)$ .

$$f(x) = \pi x + \frac{2}{x} - \frac{5}{x^7} + 3$$

4. Find the derivative  $f'(x)$ .

$$f(x) = 3\sqrt[5]{x} - \frac{2}{\sqrt[4]{x}} + \pi^2$$

5. Find the derivative  $f'(x)$ .

$$f(x) = (x^4 + 5x^2 + 2)(3x^5 - x + 7)$$

6. Find the derivative  $f'(x)$ .

$$f(x) = \frac{2x^7 - 5x}{x^6 + 4x^2 + 3}$$

7. Find the derivative  $f'(x)$ .

$$f(x) = \left(x + \frac{1}{\sqrt{x}}\right) \left(\frac{3x+1}{x^2-1}\right)$$

8. Find the derivative  $f'(x)$ .

$$f(x) = \frac{x^2 + 4}{(\sqrt[3]{x} + 2)(x^5 + 4x)}$$

9. Find the equation of the tangent line to the graph of

$$f(x) = 5x^3 + 2x^2 - 3x + 1$$

when  $x = 1$ .

4

10. Find the equation of the tangent line to the graph of

$$f(x) = \frac{2x^3 + 7x}{x + 3}$$

when  $x = 2$ .

11. Find all values of  $x$  where the tangent line to the graph of

$$f(x) = \frac{5}{3}x^3 + 14x^2 - 12x + 7$$

is horizontal.