

Limits and Derivatives Practice Sheet

1. Find the derivative of the following function. Factor the answer completely.

$$f(x) = x^7(1 - x^4)^{\frac{5}{3}}$$

2. Find the derivative of the following function. Do not simplify your answer.

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

3. Find the derivative of the following function. Do not simplify your answer.

$$f(x) = \sqrt[3]{\tan(\sin^2 x)}$$

4. Find the equation of the tangent line to the curve below at the point (1,1).

$$x^3y^2 = 2y - y^2$$

5. Evaluate the following limit.

$$\lim_{x \rightarrow 2} \frac{\frac{1}{x^3} - \frac{1}{8}}{x - 2}$$

6. Evaluate the following limit.

$$\lim_{x \rightarrow 1^-} \frac{|x - 2|}{x^2 - 5x + 4}$$

- 7a. Using the definition of the derivative find $f'(x)$ for the function

$$f(x) = \sqrt{2x + 3}$$

- 7b. Find the equation of the tangent line to $y = f(x)$ at the point (3,3).