

## Diff Cal - Practice Problems for Test #2

1. Use the product rule to differentiate.

$$f(x) = \cot x (x + 4)^{2/3}$$

2. Use the quotient rule to differentiate.

$$f(x) = \frac{2x^3 - 4x^2 + 5x - 9}{5 \sec x}$$

3. Find the derivative of  $f$  with respect to  $x$ .

$$f(x) = 5 \sin^2 \left( \sqrt{3 \csc(7x^2 - 2x)} \right)$$

4. Find the derivative of  $f$  with respect to  $x$ .

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

5. Find the derivative of  $f$  with respect to  $x$ .

$$f(x) = \log_2 \cos(5x)$$

6. Find the derivative of  $f$  with respect to  $x$ .

$$f(x) = \arcsin(x^2 - 7x)$$

7. Find the derivative of  $f$  with respect to  $x$ .

$$f(x) = e^{\arctan(2x+5)}$$

8. Find the derivative of  $f$  with respect to  $x$ .

$$f(x) = \operatorname{arccsc} x \ln(\tan(2x))$$

9. Find  $y'$  implicitly in terms of  $x$  and  $y$ .

$$x^2y + 3xy^3 = 5x^3y^2$$

10. Find  $y'$  implicitly in terms of  $x$  and  $y$ .

$$\cos x + \sin y = \tan(xy)$$

Topics from Ch 3 which we still need to practice with/test on but that will not appear on Test 2:

- finding derivative using the definition
- showing that a derivative does not exist using the alternate form of the definition
- finding the equation of a tangent line
- instantaneous and average rates of change
- higher order derivatives ( $y''$ ,  $y'''$ , etc.)