

## Math 30 – Workshop #13

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1. Compute the derivative of each of the following functions.

(a)  $f(x) = x^2 + \tan(3x^2 - x)$

(b)  $g(x) = \sec(e^x - x^4)$

(c)  $h(x) = \sqrt{\frac{x}{1+x}}$

(d)  $j(x) = \sin^2(3x + 1)$

(e)  $k(x) = x \cos(2x)$

(f)  $l(x) = \frac{e^{\sin x}}{\sin(e^x)}$

2. Find an equation for the line that is perpendicular to the graph of  $f(x) = \cos^2(x^2)$  at  $\left(\frac{\sqrt{\pi}}{2}, \frac{1}{2}\right)$ .

3. Differentiate the following.

(a)  $f(x) = \sin(x^2 e^{x^2})$

(b)  $g(x) = \tan\left(x^2 + \frac{\sin 2x}{x}\right)$

(c)  $h(x) = \sec^3(\sqrt[3]{x})$

(d)  $j(x) = e^{(2e^{x^3})}$

4. Consider the function  $f(x) = \frac{1-x^2}{xe^x}$ . We will compute the derivative of this function in two different ways.

(a) Use the quotient rule to compute  $f'(x)$ .

(b) In  $f(x)$ , rewrite the fraction as a product, then distribute and simplify. Now compute  $f'(x)$ .

(c) Which method did you prefer?