

**Take Home Quiz 3**

Official name (printed):

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

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

b)  $f(x) = 2\sqrt{x} \sin(x)$

c)  $f(x) = \csc\left(\frac{1}{x^2 + 1}\right)$

d)  $f(x) = \ln\left(\frac{x^2}{x^2 + 1}\right)$

2. Find the equation of the tangent line to  $f(x) = \sqrt{25 - x^2}$  at  $x = 3$ .

3. Let  $f(x) = x^4 - 9x^3 + 21x^2 + x - 30$ . Graph this function in the window  $-2 \leq x \leq 6$  and  $-30 \leq y \leq 40$ .

a) What are the local minima and maxima of  $f(x)$ ?

b) For what intervals is  $f(x)$  increasing?

c) For what intervals is  $f(x)$  concave down?