Circle your Instructor:
Faudree, Williams, Zirbes _____ / 25

Math 251 Fall 2017 **Quiz #6, October 18th**

Name: _____

There are 25 points possible on this quiz. This is a closed book quiz. Calculators and notes are not allowed. **Please show all of your work!** If you have any questions, please raise your hand.

Exercise 1. (4 pts.) Find $\frac{dy}{dx}$ by implicit differentiation for $\sin y = x^3 - y$.

Exercise 2. (6 pts.) Find the derivatives of the following functions.

(a) $f(x) = x \arcsin(3x)$

(b) $g(x) = \arctan(\sqrt{x})$

Exercise 3. (3 pts.) Find the derivative of the function $g(x) = \sqrt{\ln x}$.

Exercise 4. (4 pts.) Use logarithmic differentiation to find the derivative of the function

$$y = (\cos x)^{3x}.$$

Exercise 5. (8 pts.) The position function of a particle is given by $s = \frac{1}{3}t^3 - 4t^2 + 7t$ where t is measured in seconds and s in meters. Further, assume the first and second derivatives are $s'(t) = t^2 - 8t + 7$ and $s''(t) = 2t - 8$.

a.) What is the velocity function of the particle?

b.) What is the acceleration function of the particle?

c.) When is the particle at rest?

d.) When is the particle moving to the right?

e.) At time $t = 5$, is the particle speeding up or slowing down? Explain your answer.