MTH 251 Week 7 Graded Homework Name ________________________________

Work each of these problems ***on this document*** and ***turn it in on Tuesday, 2/23/16,*** **at 11 am*.***

You should work this assignment in pencil so that you can erase and correct any errors (as opposed to scribbling out work). When writing your solutions, keep in mind the notational and formatting issues discussed and illustrated in lecture and lab. Your solution will be evaluated for your success at using correct notation, your success at showing all relevant supporting work, and your success at using appropriate organizational strategies as well as for your success at coming up with a "correct answer."

6.1.1 Exercises

Find the first derivative formula for each function. In each case take the derivative with respect to the independent variable as implied by the expression on the right side of the equal sign. **Make sure that you use the appropriate name for each derivative.** Don't forget to show each application of the product rule, quotient rule and chain rule using proper Leibniz notation.

1. $h(t) = \cos\left(\sqrt{t}\right)$

2. $P = \sin\left(\theta^4\right)$

4. $z = 7\left[\ln(t)\right]^3$

5. $z(\theta) = \sin^4(\theta)$

6.2.1 Exercises

Find the first derivative formula for each function. In each case take the derivative with respect to the independent variable as implied by the expression on the right side of the equal sign. **Make sure that you use the appropriate name for each derivative.** Don't forget to show each application of the product rule, quotient rule and chain rule using proper Leibniz notation.

1. $f(x) = \sin\left(xe^x\right)$

2. $g(x) = x\sin\left(e^x\right)$

6.3.1 Exercises

Consider the function $g(t) = \ln\left(\dfrac{5}{t^3 \sec(t)}\right)$.

7. Use the quotient, product, and power rules ***of logarithms*** to expand the formula for $g(t)$ into three logarithmic terms. Then find $g'(t)$ by taking the derivative of the expanded version of g. Don't forget to show each application of the chain rule using proper Leibniz notation.

This is not a problem from the lab manual. There are practice problems of this type in the supplemental exercises.

Find each value using the function $p(x)$ shown in Figure 1.

EXAMPLE Find $h'(-3)$ if $h(x) = p(p(x))$

$$h'(x) = p'(p(x)) \cdot \frac{d}{dx}(p(x))$$
$$= p'(p(x)) \cdot p'(x)$$

so $$h'(-3) = p'(p(-3)) \cdot p'(-3)$$
$$= p'(2.5) \cdot p'(-3)$$
$$= -4 \cdot \tfrac{1}{2}$$
$$= -2$$

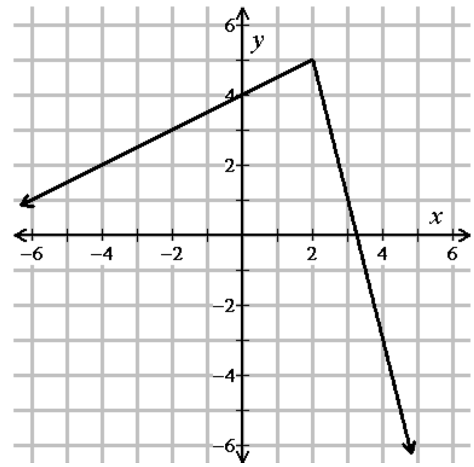

Figure 1: $y = p(x)$

3.1 Find $l'(4)$ if $l(x) = p(\sqrt{x})$

3.3 Find $\frac{d}{dx}(m(3))$ if $m(x) = p(p(x))$

3.2 Find $t'(0)$ if $t(x) = p(x) \cdot \sqrt{p(x)}$