MAT 161 Test 2 Name _____
Spring 2016

For complete credit, show all work.

1. A population grows at a constant relative growth rate; at t= 1 hour, the population is 5 and at t = 5 hours the population is 10. Find the relative growth rate and determine the population when t = 9 hours.

2. Calculate the linearization of $f(x) = x^{\frac{5}{4}}$ at $a = 16$ Then estimate $(10.02)^{\frac{5}{4}}$ using the linearization.

3. Water is leaking at the rate of ½ cubic feet per hour from an aquarium in the shape of a rectangular box 2 feet by 3 feet by 4 feet high. At what rate is water level falling when the water level is 1 foot?

In problems 5-10, calculate the derivative of y with respect to x.

4. $f(x) = x^3\sqrt{1+2x^5} + 5x + 4.$

5. $y = \dfrac{\log(2x)}{9^{8x}}$

6. $y = \sin(\cos(x)) + \arctan(x)$

7. $\ln(y^2 - 5xy) \ + 3xy = (7x + y)$

8. $y = \arcsin(5x) - \cos(x^2)$

9. $y = (5x^2 + 3)^{\sin(x)}$