

Spring 2008 Math 151

Week in Review # 7

sections: 4.3-4.5

courtesy: Joe Kahlig

Section 4.3

- Evaluate: $4^{2\log_4 9}$
- Use the fact that $\log_a 2 = 0.38$, $\log_a 3 = 0.63$, and $\log_a 5 = 0.88$ to compute these logarithms.
 - $\log_a 20$
 - $\log_a \left(\frac{81}{a^3}\right)$
- Solve for x .
 - $5(10)^{4x} = 3$
 - $\log(x - 2) + \log(x + 4) = \log 7$

(c) $\log_{27}(4\log_2(5x - 4) - 17) = \frac{1}{3}$

Section 4.4

For problem 4-9, find the derivatives of these functions.

4. $y = \log_5(7 - 4x) + 3^{\sec(2x)}$

5. $y = \ln(\ln(3x + 1))$

6. $y = 7^{x^2} \log(x^4 + 1)$

7. $y = \ln \sqrt{\frac{x^2 + 5}{5x - 8}}$

8. $y = (x^2 + 3)^{\cos(2x)}$

9. $y = \frac{(2x + 4)^5(x^3 + 1)^4}{(7x + 5)^3}$

Section 4.5

10. A bacteria culture starts with 800 bacteria and will have 1000 bacteria after 30 minutes. Assume that the culture grows at a rate proportional to the number of bacteria present.

(a) Find a formula for the number of bacteria after t hours.

(b) Find the number of bacterial after 1 day.

(c) When will the population reach 3200 bacteria.

11. A curve passes through the point $(0, 10)$ and has the property that the slope of the curve at every point P is three times the y -coordinate of P . Find the equation of this curve.

12. A chemical has a half-life of 18 days. A sample is obtained and 5 days later there remains 50 grams of the chemical.

(a) Find a formula that will give the amount of the chemical that remains t days after the sample is obtained.

(b) What was the initial amount of the sample of this chemical?

(c) How long will it take until 70% of sample is gone?

13. A turkey is taken from a $350^\circ F$ oven into a room with a temperature of $80^\circ F$. Fifteen minutes later, the turkey is 250° . What will the temperature be after 40 minutes?

14. A tank contains 200 gallons of a salt solution with a concentration of 0.1 lbs/gallon. Pure water enters the tank at a rate of 5 gallons per minute. The solution is thoroughly mixed and exits the tank at the same rate.

(a) Find a formula that will give the amount of salt in the tank after t minutes.

(b) How many lbs of salt will be in the tank after half an hour?