Summer 2016 Math 151

Week in Review 3

courtesy: Amy Austin

(covering 4.3-4.6)

Section 4.3-4.6

1. Evaluate $\log_3 108 - \log_3 4$

2. Express $\log_8 x - \log_8 \sqrt{9x+2} + \log_8(x+1)$ as a single logarithm.

3. Solve for x: $\log(x+3) + \log(x) = 1$

4. Solve for x: $y = \ln(7x-9)$

5. Solve for x: $\ln x - \ln(x+1) = \ln 2 + \ln 3$

6. Find the inverse of $f(x) = e^{6x-3}$

7. Find $\lim_{x\to\infty}[\log(2x-1) - \log(3x+6)]$

8. Find the value of $\ln\sqrt{e^3}$

9. What is the domain of $f(x) = \ln(4-x^2)$?

Section 4.4

10. Differentiate each function:

    a.) $f(t) = \cos^2 t(\ln t)$

    b.) $f(x) = \ln(\sin 2x)$

    c.) $h(x) = \ln(\ln 3x)$

    d.) $f(x) = \log_5(e^{10x})$

    e.) $f(x) = 3^{\tan(7x)}$

    f.) $y = x^{\sin x}$

11. Find the equation of the tangent line to the graph of $f(x) = x\ln x$ at $x = e^2$.

12. What is the slope of the parametric curve $x = t\ln t$, $y = 2^{3t}$ at the point $(0, 8)$?

Section 4.5

13. A bacteria culture starts with 400 bacteria and the population triples every 20 minutes.

    a.) Find an expression for the number of bacteria after t hours.

    b.) Find the number of bacteria after 2 days.

    c.) When will the population reach 20,000?

14. A curve that passes through the point $(0, 25)$ has the property that the slope at every point (x, y) is eight times the y coordinate. Find the equation of the curve.

15. A pie is taken from an oven, where the temperature is 450°, to a 75° room. After 15 minutes, the temperature of the pie reads 350°. What will the temperature of the pie be after 27 minutes?

Section 4.6

16. Compute the following without the aid of a calculator.

    a.) $\arcsin\dfrac{\sqrt{3}}{2}$ b.) $\arccos(-\dfrac{1}{\sqrt{2}})$

    c.) $\sin^{-1}(-\dfrac{\sqrt{2}}{2})$ d.) $\arctan\dfrac{1}{\sqrt{3}}$

    e.) $\cot\arccos(-\dfrac{3}{5})$ f.) $\sin(\arcsin 2)$

    g.) $\arccos(\cos(\dfrac{2\pi}{3}))$ h.) $\arctan(\tan\dfrac{5\pi}{4})$

    i.) $\arcsin(\sin((\dfrac{11\pi}{6}))$ j.) $\sin(2\arccos(\dfrac{1}{3}))$

17. Find the derivative of $y = \arctan(1-x)$

18. Find the equation of the tangent line to the graph of $y = \arcsin\dfrac{x}{2}$ at $x = -1$.

19. What is the domain of $f(x) = \arcsin(2x-1)$? Of $\arctan(2x-1)$?

20. $\cos(\arctan x)$ is equivalent to what?