Math 131 Help Session Questions

1. Find the domain of the function $G(x) = \dfrac{\sqrt[4]{x+10}}{\ln|x-5|}$.

2. Solve for x: $\log(\log_3(\log_2(x-1))) = 0$

3. Evaluate the following:

   a) $\lim\limits_{x\to\infty} \dfrac{x^2+5x-6}{2x^2-x-3}$.

   b) $\lim\limits_{x\to -5} \dfrac{2x+10}{|x+5|}$.

   c) $\lim\limits_{x\to 0^-} e^{\frac{1}{x}}$.

4. For what values of x is $f(x)$ continuous?

$$f(x) = \begin{cases} \dfrac{x^2-4}{x-2}, & \text{if } x \le 4 \\ \dfrac{10x+20}{x+6}, & \text{if } x > 4 \end{cases}$$

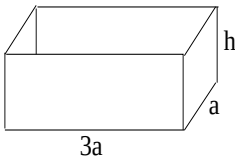
5. If $f(x) = e^{-x^2}$,

   a) find where $f(x)$ is increasing and decreasing and identify local extrema.

   b) find concavity and inflection points.

6. Differentiate $f(x) = \log_3 \sin\left(e^{-3x}\right)$.

7. A box has a rectangular bottom, with one side three times as long as the other, and an open top. The total area of the material used to make the box is 144cm^2. What is the largest possible volume the box can have? What are the dimensions of the box with the largest volume?



8. Evaluate $\int \cos^4\theta \sin\theta \, d\theta$.

9. A ball is thrown upward with an initial velocity of 64 feet per second from an initial height of 80 feet. (Assume the gravitational force on the ball is 32 ft/s^2.)

   a) Find the position function that gives the height s as a function of time t.

   b) When does the ball hit the ground?