Quiz 2 Study Guide Math 2924 Fall 2022

Graphs and limits for exponential and logarithmic functions (see pg 422-425 of the textbook Sec 6.3)

1. Practice graphing problems like Webwork 6.3 problems 5, 23, 24
2. Evaluate $\lim_{x\to\infty} \ln(x)$ and evaluate $\lim_{x\to 0^+} \ln(x)$
3. Sketch $y = \ln(x)$
4. Evaluate $\lim_{x\to\infty} \log_b(x)$ for $b > 1$ and evaluate $\lim_{x\to 0^+} \log_b(x)$ for $b > 1$
5. Sketch $y = \log_b(x)$ for $b \geq 1$
6. Sketch $y = b^x$ for $b > 1$, like $y = 4^x$ or $y = e^x$
7. Sketch $y = b^x$ for $b < 1$, like $y = (0.8)^x$
8. Sketch $y = 1^x$ (this is the same as $y = 1$)
9. Be able to shift graphs up, down, to the right, to the left, like in textbook Sec 6.3 Example 8 and Webwork 6.3 Problems 23, 24.

Differentiate using natural log (see pg 428-432 of the textbook Sec 6.4)

1. Memorize the formula for the derivative of $\ln(x)$ (pg. 428)
2. Use chain rule and the above formula to compute derivatives of functions similar to textbook Sec 6.4 Examples 1,2,3,4:
$$\frac{d}{dx}\ln(x^3+1), \quad \frac{d}{dx}\ln(\sin x), \quad \frac{d}{dx}\sqrt{\ln x}, \quad \frac{d}{dx}\ln\left(\frac{x+1}{\sqrt{x-2}}\right)$$
3. After you differentiate, use the derivative to compute the slope of the tangent line at a specific point (like Webwork 6.4 Problem 3)
4. Use chain rule to differentiate functions similar to in Webwork 6.4 Problems 2, 3, 5

Integrate using natural log (see pg 431-432 of the textbook Sec 6.4)

1. Memorize the integration formula for $\int \frac{1}{x}\, dx$ (pg. 431)
2. Use u-substitution and the above formula to compute integrals like textbook Sec 6.4 Examples 9, 10, 11:
$$\int \frac{x}{x^2+1}\, dx, \quad \int \frac{\ln x}{x}\, dx, \quad \int \tan x\, dx$$
3. Webwork 6.4 Problems 8, 9, 10, 18

Note:

- The quiz will be at the beginning of class. Know your ID number, since you will need to write it on the quiz paper.
- Bring pens/pencils
- Blank scratch paper will be provided. Calculators are not permitted and are not needed (no simplification is needed).