

Quiz 7 will cover the following topics: all topics from Quiz 1-6, Exams 1, 2 and graphing of factored polynomials, logarithms 2, and concavity behavior and points of inflection.

## Review Problems

1. Simplify each of the following expressions.

a)  $\log_6 2 + \log_6 18$       b)  $\log_4 \sqrt{32}$       c)  $3^{\log_9 5}$

2. Suppose that  $x = \log_2 5$ . Express each of the following in terms of  $x$ .

a)  $\log_2 10$       b)  $\log_2 100$       c)  $\log_5 2$       d)  $\log_5 10$

3. Solve each of the following equations.

a)  $\log_2 (x - 8)(5x - 13) = 5$       c)  $\log_3 (2x - 5) - \log_3 (x - 5) = -1$   
b)  $\log_2 (x - 8) + \log_2 (5x - 13) = 5$       d)  $\log_6 x + \log_6 (2x + 1) = 2$

4. Differentiate each of the functions given.

a)  $f(x) = 100x^5 + 5x^{100} + e^{500}$       c)  $f(x) = \sqrt{x^3} - \sqrt[3]{x^2} - \log_3 (x^2 - 5x)$   
b)  $f(x) = x^6 + 6^x + \frac{1}{x^6}$       d)  $f(x) = \frac{1}{5}xe^{5x} - \frac{1}{25}e^{5x}$

5. Evaluate each of the following indefinite integrals.

a)  $\int x^2 + x + \frac{1}{x} + \frac{1}{x^2} dx$       b)  $\int 3^x dx$       c)  $\int e^x + e^{-x} dx$       d)  $\int \sqrt{x^3} - \sqrt[3]{x^2} dx$

6. The derivative of function  $f$  is given as  $f'(x) = (x + 4)(x + 2)^2(1 - x)(4 - x)^2$

- Sketch the graph of  $f'$
- Sketch the graph of  $f$ .
- How many points of inflection does  $f$  have?

## Review Problems - Answers

1. a) 2    b)  $\frac{5}{4}$     c)  $\sqrt{5}$

2. a)  $x + 1$     b)  $2x + 2$     c)  $\frac{1}{x}$     d)  $\frac{1}{x} + 1$

3. a)  $\frac{8}{5}, 9$     b) 9    c) no solution    d) 4

4. a)  $f'(x) = 500x^4 + 500x^{99}$     b)  $f'(x) = 6x^5 + 6^x \ln 6 - \frac{6}{x^7}$   
c)  $f'(x) = \frac{3}{2}\sqrt{x} - \frac{2}{3\sqrt[3]{x}} - \frac{2x-5}{\ln 3(x^2-5x)}$     d)  $f'(x) = xe^{5x}$

5. a)  $\frac{x^3}{3} + \frac{x^2}{2} + \ln|x| - \frac{1}{x} + C$     b)  $\frac{3^x}{\ln 3} + C$     c)  $e^x - e^{-x} + C$     d)  $\frac{2}{5}x^{5/2} - \frac{3}{5}x^{5/3} + C$

6. a) black graph    b) red graph    c) 5

