Classwork 11

College Algebra and Trigonometry, MTH 123, Section 3260, Fall 2011

Instructor: Abhijit Champanerkar

Nov 2nd 2011

Name: SOLUTIONS

1. Evaluate the expression using Laws of Logarithms.

1. $\log_2 6 - \log_2 15 + \log_2 20$ $= \log_2 \frac{6}{15} + \log_2 20$

$= \log_2 \frac{2}{5} + \log_2 20 = \log_2 \frac{2}{5} \times 20$

$= \log_2 8$

$= \log_2 2^3 = 3$

2. $\log_4 16^{100} + \log_4 64$

$= 100 \log_4 16 + \log_4 64$

$= 100 \log_4 4^2 + \log_4 4^3$

$= 100 \times 2 + 3 = 203$

3. $\ln(\ln e^{e^2})$

$= \ln e^2 = 2$

2. Use Laws of Logarithms to expand or combine the expressions.

1. (Expand) $\log_3 x\sqrt{y}z^2$ $= \log_3 x + \log_3 \sqrt{y} + \log_3 z^2$

$= \log_3 x + \frac{1}{2}\log_3 y + 2\log_3 z$

2. (Combine) $\ln(a+b) + \ln(a-b) - \ln c$ $= \ln \frac{(a+b)(a-b)}{c}$

$= \ln \frac{(a^2-b^2)}{c}$

3. (Expand) $\log \frac{x^2y^3}{z^5w^4}$ $= \log x^2 + \log y^3 - \log z^5 - \log w^4$

$= 2\log x + 3\log y - 5\log z - 4\log w$