

MATH 120 In-class Activity

Day 18

Question Number π^0 :

Simplify the following expressions using rules of exponents.

(a) $(27)^{2/3} =$

(b) $x^6 + x^6 + x^6 =$

(c) $(7y)^2 =$

(d) $(x + y)^2 =$

(e) $\frac{x^{100}}{x^{200}} =$

(f) $(-4)^{-4} =$

(g) $(5)^{1/2} \cdot (125)^{1/2} =$

(h) $\frac{6^{2n}}{2^n} =$

Question Number $(100/25)^{1/2}$:

Is the number 0 even, odd, or neither? What does that mean about the value of $(-1)^0$?

Question Number $\sqrt[4]{3} \cdot \sqrt[4]{3} \cdot \sqrt[4]{3} \cdot \sqrt[4]{3}$:

Simplify the following emoji expressions using the rules of logarithms. For example,

$$\log(\text{😄}) = \text{💧} \log(\text{😄})$$

(a) $\log(\text{👁️👁️}) =$

(b) $\log(\text{💕}) =$

(c) $\log(\text{😞}) =$

(d) $\log(\text{🌀🌀🌀}) =$

(e) $\log(\text{👨}) =$

Question Number $\ln(e^4)$:

Simplify the following expressions using various rules of exponents and logarithms.

(a) $\ln(e^9) =$

(b) $10^{\log_{10}(2022)} =$

(c) $\log_2(8^5) =$

(d) $\log_2(48) - \log_2(3) =$

(e) $\log_2(2^n + 2^n) =$

(f) $\log_{10}(64) + \log_{10}(36) =$

(g) $\log_{10}(10^a) \log_{10}(10^b) =$

(h) $6 \log_{10}(\sqrt{n}) =$

(i) $\ln(512)/\ln(2)$

Question Number $5^{\log_7(7)}$:

Use the rules of logarithms to write the following expression in the form $\log_2(\text{something})$.

$$3 \log_2(a) + 4 \log_2(b) - 5 \log_2(c)$$

Question number $\log_{10}(2^6) + \log_{10}(5^6)$:

(a) Write the following in a very compact expression:

$$f(n) = \log_{10}(1) + \log_{10}(2) + \log_{10}(3) + \cdots + \log_{10}(n).$$

(b) Calculate $f(20)$ using an external device.

(c) The number of digits in a positive integer n is $\lfloor \log_{10}(n) \rfloor + 1$. Why is that?

(d) Use the answer to part (b) to determine the number of digits in $20!$.