

# Math 201 Quiz 3A

September 9, 2019

Name: ANSWERS

Instructions: No calculators. Use your own scrap. Write your fully simplified answers in the space provided.

1. Complete the following rules:

(a)  $a^x \cdot a^y = a^{x+y}$  (b)  $a^{\frac{x}{y}} = \sqrt[y]{a^x}$  or  $\sqrt[a]{a^{x/y}}$  (c)  $\log_a(x^n) = n \log_a x$

(d)  $\log_a\left(\frac{x}{y}\right) = \log_a x - \log_a y$  (e)  $\log_a 1 = 0$  (f)  $\log_a 0 = \text{undefined}$

(g)  $(a^x)^y = a^{xy}$  (h)  $\log_a b = c$  means  $a^c = b$

(i)  $x^{-a} = \frac{1}{x^a}$  (j)  $\log_a a^x = x$

2. True or false:  $\log_a(x+y) = \log_a x + \log_a y$  F

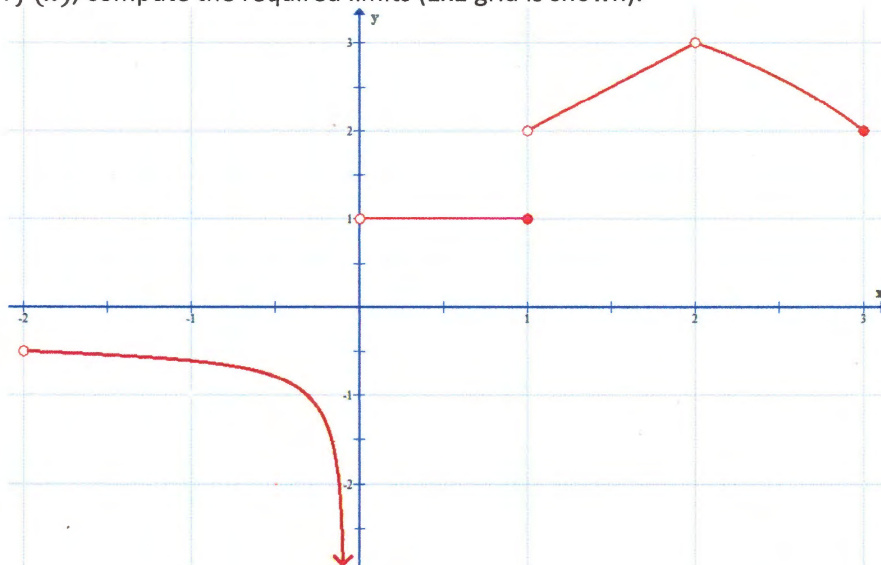
3. Expand and simplify:  $\ln\left(\frac{x^7 \sqrt{pq^3}}{e^5}\right) = 7 \ln x + \frac{1}{2} \ln p + \frac{3}{2} \ln q - 5$

4. Simplify:  $e^{2 \ln \sqrt{9} + 2 \ln x} = 9x^2$

5. Solve the following equations:

(a)  $2e^{3x-1} = 5 \Rightarrow x = \frac{1}{3}(\ln \frac{5}{2} + 1)$  (b)  $\ln \sqrt{x+1} = 3 \Rightarrow x = e^6 - 1$

6. Given the graph  $f(x)$ , compute the required limits (1x1 grid is shown):



(a)  $\lim_{x \rightarrow 1^-} f(x) = \text{DNE}$  (b)  $\lim_{x \rightarrow 1/2} f(x) = 1$  (c)  $\lim_{x \rightarrow 2} f(x) = 3$

Bonus: (You must attempt all problems above to be eligible)

1. Compute: (a)  $\lim_{x \rightarrow -1} \frac{x+1}{x^2+1} = 0$  (b)  $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$  (c)  $\lim_{x \rightarrow 2} \frac{x+2}{x^2-4} = \text{DNE}$