Name: Solutions

Math 156 PRECALCULUS
Fall 2015

Quiz 7 – Version A

Thursday, October 29, 2015

This quiz has 8 problems worth a total of 30 points. It is TWO SIDED.

1. (2 points) Express the equation $\boxed{\log 3 = 2t}$ in exponential form. (You don't need to solve it.)

Answer: $10^{2t} = 3$

2. (2 points) Express the equation $\boxed{e^{0.7t} = r}$ in logarithmic form.

Answer: $\ln r = 0.7t$

3. (2 points each) Evaluate the expressions below.

(a) $\log_9 \sqrt{3} = y$

$9^y = 3^{\frac{1}{2}}$

$3^{2y} = 3^{\frac{1}{2}}$ → $2y = \frac{1}{2}$

$y = \frac{1}{4}$

Answer: $\frac{1}{4}$

(b) $e^{\ln 10}$

Answer: 10

(c) $\log_4 8 = y$

$4^y = 8$

$2^{2y} = 2^3$ → $2y = 3$

$y = 3/2$

Answer: $3/2$

4. (2 points) find the domain of the function $h(x) = \ln x + \ln(2 - x)$. Give your answer in interval notation.

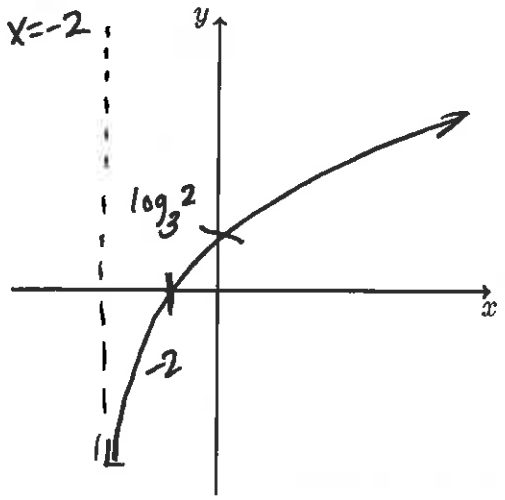
We need $x > 0$ and $2 - x > 0$

So $x > 0$ and $2 > x$ (or $x < 2$)

Answer: $(0, 2)$

5. (4 points each) Sketch the graphs of the functions below and **LABEL** (a) any asymptotes and (b) any x- or y-intercepts. State the domain and range.

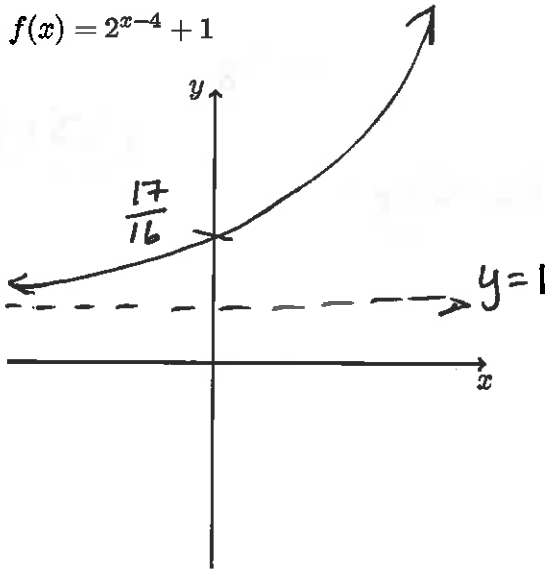
(a) $f(x) = \log_3(x+2)$



domain: $(-2, \infty)$

range: $(-\infty, \infty)$

(b) $f(x) = 2^{x-4} + 1$

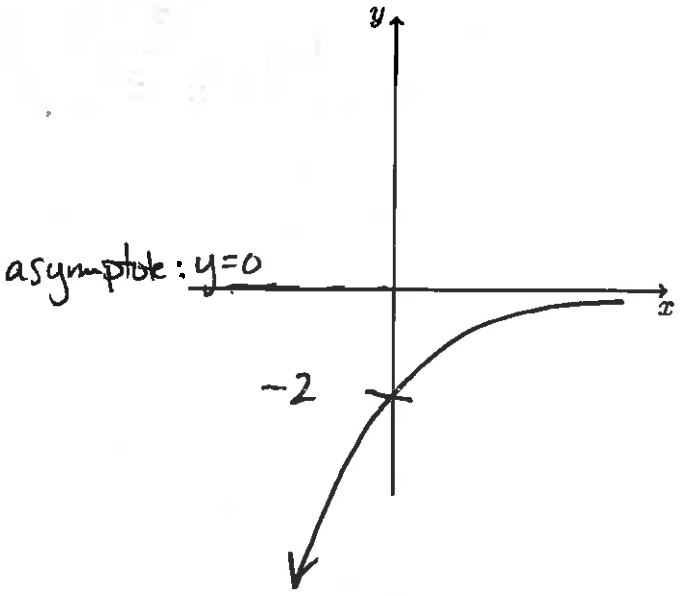


domain: $(-\infty, \infty)$

range: $(1, \infty)$

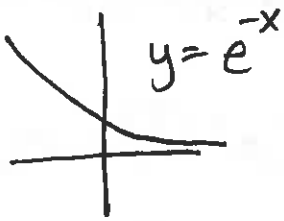
$f(0) = 2^{-4} + 1 = 1 + \frac{1}{16} = \frac{17}{16}$

(c) $f(x) = -2e^{-x}$



domain: $(-\infty, \infty)$

range: $(-\infty, 0)$



6. (2 points) Use the Laws of Logarithms to evaluate the expression

$\boxed{\frac{-1}{3}\log_5 125}$

$\frac{-1}{3}\log_5 5^3 = \frac{-1}{3}\cdot 3 = -1$

Answer: -1

7. (2 points) Use the Laws of Logarithms to expand the expression

$\boxed{\ln\left(\frac{\sqrt{3x^5}}{zy^2}\right)}$

$\ln\left(\frac{3^{\frac{1}{2}}x^{\frac{5}{2}}}{zy^2}\right) = \frac{1}{2}\ln 3 + \frac{5}{2}\ln x - \ln z - 2\ln y$

Answer: $\frac{1}{2}\ln 3 + \frac{5}{2}\ln x - \ln z - 2\ln y$

8. (2 points) Use the Laws of Logarithms to combine the expression:

$\boxed{\log_a(a+b) + \log_a(a-b) - 2\log_a c}$

$\log_a((a+b)(a-b)) - \log_a c^2$

$= \log_a(a^2-b^2) - \log_a c^2$

$= \log_a\left(\frac{a^2-b^2}{c^2}\right)$

Answer: $\log_a\left(\frac{a^2-b^2}{c^2}\right)$