

Pre-Calculus Chapter 3 Pre-Test

1.) (2 pts each, 6 pts total) Evaluate exactly. Do not use decimals.

a) 7^{-2}

b) $8^{2/3}$

c) $(1/4)^{5/2}$

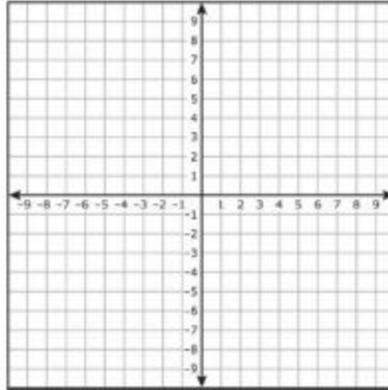
2.) (2 pts each, 4 pts total) Evaluate each function.

a) $f(x) = 4^x$, $x = 3$

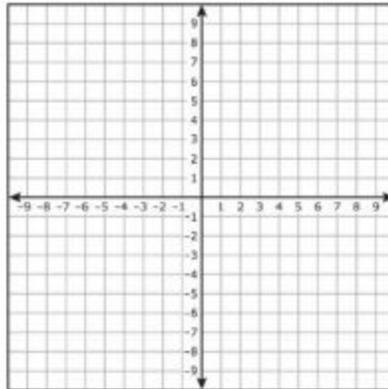
b) $g(x) = 10^{x+4}$, $x = -2$

3.) (5 pts each, 10 pts total) Graph each function. Identify at least two points on the line (please use points indicated in class).

a) $y = 3^{x+2}$



b) $y = 5^{x-3} + 2$



4.) (2 pts each, 4 pts total) Write each logarithmic equation in its equivalent exponential form.

a) $\text{Log}_6 216 = 3$

b) $\log_b x = a$

5.) (2 pts each, 4 pts total) Write each exponential equation in its equivalent logarithmic form.

a) $4^7 = 16384$

b) $0.001 = 10^{-3}$

6.) (2 pts each, 4 pts total) Evaluate the logarithms exactly. Show conversion to exponential form for full credit.

a) $\log_8 1$

b) $\log 10^{-5}$

7.) (8 pts total) State the domain of the logarithmic function. Please show work (do not simply graph).

$$f(x) = \log_3(x - 2)$$

8.) (2.5 pts each, 5 pts total) Apply the properties of logarithms to simplify each expression.

a) $8^{3\log_8 5}$

b) $e^{\ln(x^2 - 4)} = 2$

9.) (5 pts each, 10 pts total) Write each expression as a sum or difference of logarithms.

a) $\log_b \left(\frac{x^2 y^7 z^{-3}}{a^4} \right)$

b) $\log_b \left(\frac{x^2 + 2x - 3}{x^2 - 6x + 8} \right)$

10.) (5 pts each, 10 pts total) Write each expression as a single logarithm.

a) $6 \log_b a + 2 \log_b c - 3 \log_b d$

b) $\frac{1}{2} \log e - 3 \log f - 2 \log h$

11.) (5 pts each, 10 pts total) Evaluate each logarithm using change-of-base formula.

a) $\log_9 23$

b) $\log_2 a$

12.) (5 pts each, 15 pts total) Solve each exponential equation. Leave answers as a fraction if necessary (no decimals).

a) $\log(3x + 4) = 2$

b) $\log_2(x - 2) + \log_2(x + 4) = 4$

c) $\ln(x) + \ln(x + 2) - \ln(3x) = 6$

13.) (1 pts each, 10 pts total) Complete the table by including the corresponding letter.

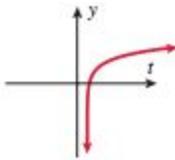
Graph Name	Model	Graph
Gaussian distribution		
Logistic growth		
Exponential growth		
Logarithmic		
Exponential decay		

a) $f(t) = ce^{kt} \quad k > 0$

c) $f(x) = ce^{\frac{-(x-a)^2}{k}}$

e) $f(t) = a + c \log t$

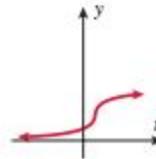
f)



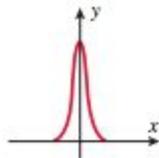
b) $f(t) = ce^{-kt} \quad k > 0$

d) $f(t) = \frac{a}{1 + ce^{-kt}}$

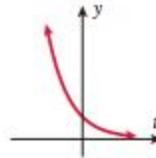
g)



h)



i)



j)

