

Advanced Functions - Review for Functions/Regression Test WS

Answer each question or complete each problem. Show your work!!

- What is the domain and range of the following function: $y = |x - 3| - 2$?
- What is the domain and range of the following function: $y = \sqrt{x + 4} + 1$?
- Write the following inequality in interval notation: $\mathbb{R}, x \neq -2, 3$
- What is the asymptote, domain, and range of $y = 3^{x+2} - 5$?
- What is the asymptote, domain, and range of $y = \ln(x - 3) + 4$?
- Write the following in logarithmic form: $3^2 = 9$.
 - Write the following in exponential form: $\log_8 \left(\frac{1}{512} \right) = -3$
- Evaluate each expression:
 - $\log_5 625$
 - $\log_4 \left(\frac{1}{32} \right)$
 - $\log_x 4 = \frac{1}{3}$
 - $e^{\ln 14 - \ln 2}$
 - $\log_3 27 + \log_3 9$
 - $\log \sqrt{1000}$
- Solve the following exponential equations (round to 3 places):
 - $8^{2x+4} = 32$
 - $4^{3x+5} = 3$
 - $6^{6-4x} = \frac{1}{36}$
 - $6e^{4x-1} - 4 = 8$
- Solve the following logarithmic equations (round to 3 places):
 - $\log_5 (2x + 4) - \log_5 3 = \log_5 10$
 - $2 \log_7 (-9x - 8) - 1 = 5$
 - $\log_2 9 + 2 \log_2 x = \log_2 144$
 - $3 - 4 \ln(x + 6) = 7$
- You bought an antique that appreciates by 6% each year you own it. The original value of the antique was \$200. How much will the antique be worth after you've owned it for 8 years?
- George is investing \$1500 into an account with a 7% interest rate.
 - How long will it take for the account to be \$2,126 if the money is compounded monthly?
 - How long will it take for the account to triple if the money is compounded continuously?
- Use the pH formula to find the following:
 - What is the pH of a liquid with a hydrogen ion concentration of $6.5 \times 10^{-8} \text{ M}$?
 - What is the hydrogen ion concentration of a juice drink if its pH is 2.6?

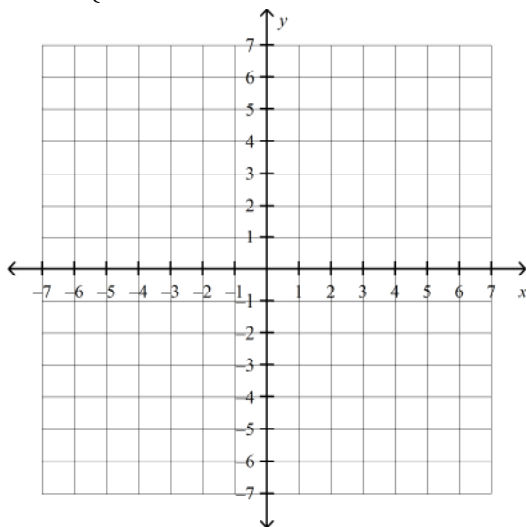
13. Determine if the following are power functions? If so, what are the values of k and p:

a.) $f(x) = \sqrt{\frac{36}{x^{16}}}$

b.) $f(x) = 9 \bullet 5^x$

14. Write a power function in the form $y = k \bullet x^p$ that contains the points (13 , 12) and (1 , 10).
15. The temperature T of a given mass of gas varies inversely with its volume V. The temperature of 105 cubic centimeters of a certain gas is 30°C. What will the volume of the gas if the temperature is 37.5°C?
16. Graph and state domain/range for the following piecewise function:

$$f(x) = \begin{cases} -2 & \text{if } x < -3 \\ 2x + 1 & \text{if } -3 \leq x \leq -1 \\ 2\sqrt{x-1} + 1 & \text{if } x \geq 1 \end{cases}$$



The number of females practicing medicine as MDs is given in the table for selected years. An EXPONENTIAL model best fits this data set.

Year (1980 = 0)	0	5	10	13	14	15	16
Female MDs (1000s)	48.7	74.8	96.1	117.2	124.9	140.1	148.3

17. Based on the appropriate model, how many female physicians were practicing in 2000?
18. Based on the appropriate model, when will the number of practicing female physicians reach 300,000?

Biologists have found that the number of chirps some crickets make per minute is a linear relationship. When the temperature is 68° F, the crickets chirp 124 times a minute. When it's 80° F outside, the crickets chirp 172 times a minute.

19. How warm is it when the crickets are chirping 150 times a minute?
20. If the temperature is 96° F, how many times per minutes will the crickets chirp?