

NAME:

1. [8] TRUE/FALSE: Circle T in each of the following cases if the statement is *always* true. Otherwise, circle F. Let f be a function, and x , y , and z be real numbers.

T F $x^{-2} = \sqrt{x}$

T F x^2 is a polynomial

T F A savings account starting with \$300 that has an annual interest rate of 5% compounded monthly has $300(1 + \frac{.05}{3})^{12 \cdot 3}$ dollars after three years.

T F $\log(x + 2) = \log(x) + \log(2)$

T F $\frac{\log(x)}{\log(y)} = \frac{x}{y}$

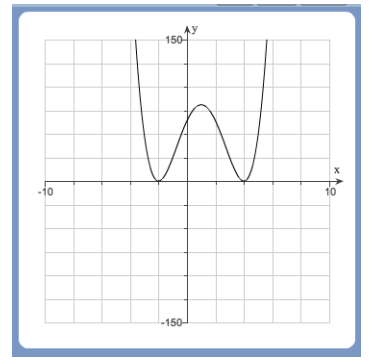
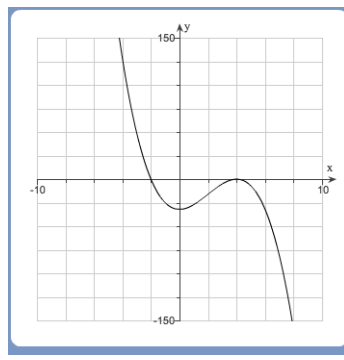
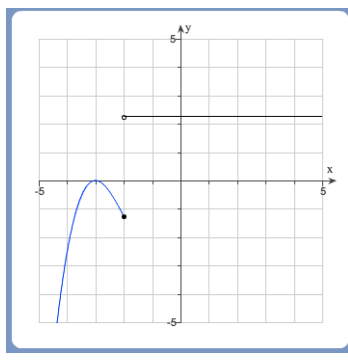
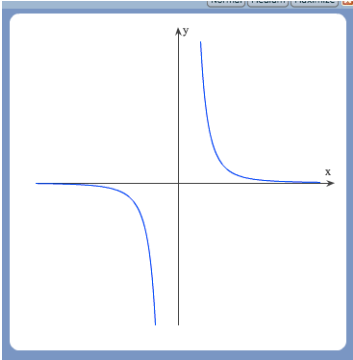
T F $\log_6(36) = 2$

T F $6x - 5$ divides $18x^2 + 15x - 25$

T F $2 \cdot 8^x = 16^x$

Show your work for the following problems. The correct answer with no supporting work will receive NO credit.

2. [3] Solve for y : $10^{xy} = 8$



3. [2] (PolyWks #9) Identify all of the above graphs that could be the graph of an even degree polynomial?

4. Find all x that satisfy the following:

(a) [3] (WebHW8 #13) $4 \cdot 3^{2x-3} + 4 = 15$

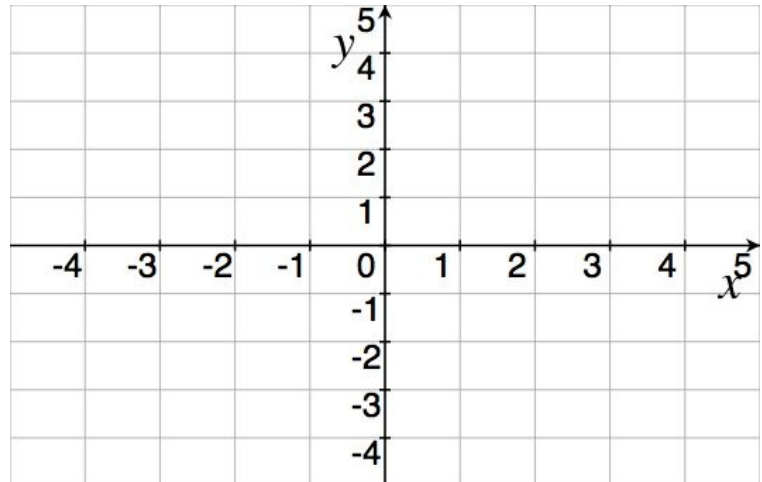
(b) [4] (PracticeExam #8) $\log(x - 16) = 2 - \log(x - 1)$

5. Let $f(x) = \log_3(x + 1) + 2$.

(a) [3] (PracticeExam #9)
Carefully graph f .

(b) [2] What is the domain of f ?

(c) [3] (PracticeExam #9)
Find the inverse of f .



6. (Quiz3 #3) The piece-wise defined function h is graphed to the right and is of the form:

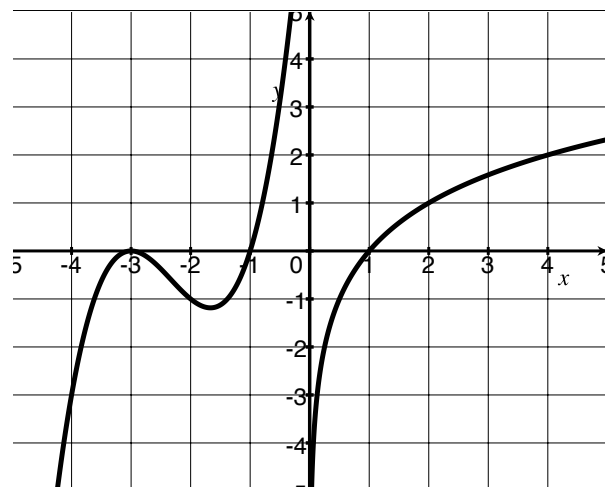
$$h(x) = \begin{cases} p(x) & \text{if } x < 0 \\ \log_b(x) & \text{if } 0 < x \end{cases}$$

where $p(x)$ is a polynomial that when completely factored is of the form $(x - c)^m$ and is of degree three.

(a) [1] Find $h(-2)$.

(b) [2] Does h have an inverse? Why or why not?

(c) [5] Find the (algebraic rule for the) function h .



7. [4] (expwks #2) Assume that s and t are positive, simplify: $\left(\frac{3s}{5s^{-2}\sqrt{t}}\right)^4$

8. [4] Choose *ONE* of the following. Clearly identify which of the two you are answering and what work you want to be considered for credit.

No, doing both questions will not earn you extra credit.

(a) (WordWks #10) How many times stronger is stomach acid than vinegar? Assume that vinegar has a pH level of 3.2 and stomach acid has a pH level of 1.6. Now that the pH level of an object is computed by $-\log[\text{H}^+]$ where $[\text{H}^+]$ is the concentration of hydrogen ions (in Moles) per liter.

(b) (§3.5 #54a) Compare the intensity of the Tacoma February 2001 earthquake that measured 6.8 on the Richter scale, to the intensity of the March 2011 earthquake in Japan that measured 9.0 on the Richter scale. Recall that the magnitude M of an earthquake is a function of its intensity I and is defined by $M = \log\left(\frac{I}{I_0}\right)$ where I_0 is the intensity of the zero-level earthquake.

9. [6] Choose *ONE* of the following. Clearly identify which of the two you are answering and what work you want to be considered for credit.

No, doing both questions will not earn you extra credit.

- (a) (WebHW9 #5) The population of a town was 6,000 in 1990 and grew to 8,000 in 2000. Assume that the population will continue to grow exponentially.
- i. [4] What will the population be in 2015?
 - ii. [2] When will the population hit 12,000?
- (b) (WordWks #12) In a large lake, one-fifth of the water is replaced by clean water each year. A chemical spill deposits 60,000 cubic meters of soluble toxic waste into the lake.
- i. [4] How much of this toxin will be left in the lake after four years?
 - ii. [2] When will the toxic chemical be reduced to 6000 cubic meters?