TMath 120

NAME:

1. [6] TRUE/FALSE: Circle T in each of the following cases if the statement is *always* true. Otherwise, circle F.

   T   F $\dfrac{1}{a} + \dfrac{1}{ab} = \dfrac{b+1}{ab}$

   T   F $x^{\frac{1}{2}} = x^{-2}$

   T   F $(x2)^3 = x^3 8$

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

   T   F $\log_3(\log_3(3)) = 0$

   T   F $30°$ is co-terminal with $390°$.

   Show all your work. Reasonable supporting work must be shown to earn credit.

2. [2] (WebHW4.1 #12) Let $\theta = \frac{-\pi}{3}$ radians. Convert θ into degrees.

3. [3] (WebHW41.#7) Solve for x in $\log_4(x^2 - 9x + 22) = 1$

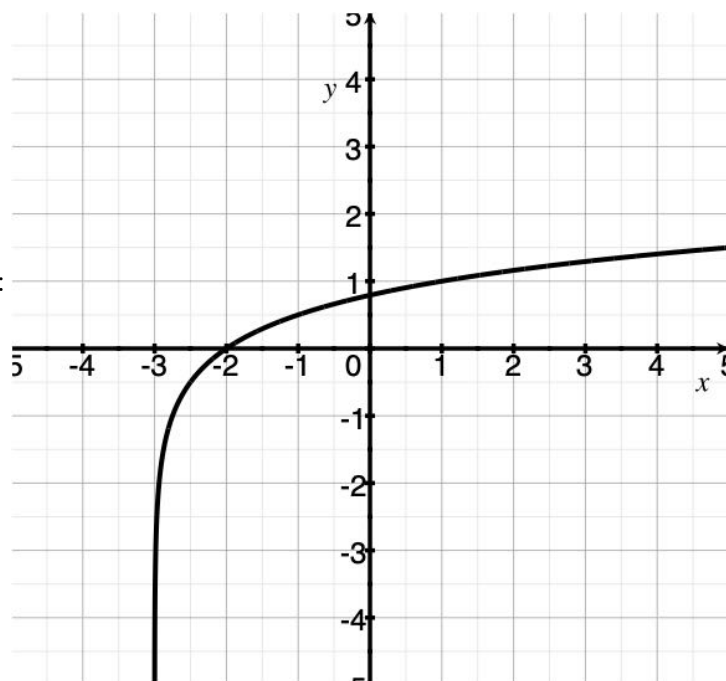4. Let f be a logarithmic function that has been horizontally shifted.

(a) [2] (PracticeExam2#9)
Does f have an inverse?
Why or why not?

(b) Estimate the following *if* possible:

i. [1] (WebHW3.1#9) $f(1)$

ii. [2] (§3.2#56)
The domain of f.

iii. [2] All x such that $f(x) = 0$.

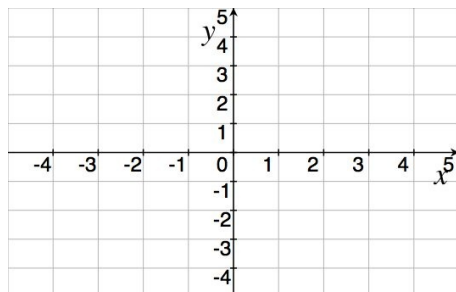(c) [3] (LogFunctionActivity#3) Find the algebraic rule/formula/equation for f.

5. Given $\log_5(x) = 2$ and $\log_5(y) = 8$.
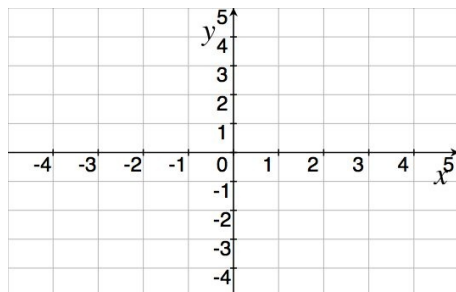
(a) [2] (LogFunctionsActivity#2) Find x.

(b) [3] (Quiz3 #2) Find $\log_5\left(\frac{5x}{y}\right)$.

6. Provide a graph AND an algebraic rule/expression for each of the graphs described below:

   (a) [4] (WebHW3.1#5) An exponential function vertically shifted so that it passes through $(0, -2)$.

   (b) [4] (§1.1#98) A circle centered at $(-1, 2)$ that passes through $(0, 0)$.

7. (WebHW3.4 #14) The number of people in a community who became infected during an epidemic t weeks after its outbreak is well approximated by $f(t) = \dfrac{35,000}{1 + ae^{-kt}}$ where $35,000$ people of the community are susceptible to the disease. Assume that $3,000$ people were infected initially, and $8,525$ were infected by the end of the fourth week.

   (a) [4] Find the values for a and k so f models this epidemic.

   (b) [1] Use f to predict the number of infected people at the end of the 8th week.

8. (LogsPractice2#5&6)

   Decibels: The loudness of a sound (measured in decibels) is related to intensity I by

   $$10 \log \left(\frac{I}{S} \right)$$

   where $S = 10^{-12}$ W/m^2.

   (a) [3] France passed a law limiting iPods and other MP3 players to a maximum possible volume of 100 decibels. Find the maximum intensity (in W/m^2) an iPod is legally allowed to output in France.

   (b) [3] Normal conversation has a sound level of about 65 decibels. How many more times intense than normal conversation is the sound an iPod operating at the French maximum of 100 decibels?