Math 114
Midterm 3 Part 2 Version L
Wed Jun 8, 2011

Name: _____

SCORE: _____ / 35 POINTS

NON-GRAPHING CALCULATORS ONLY

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

SCORE: ___ / 12 POINTS

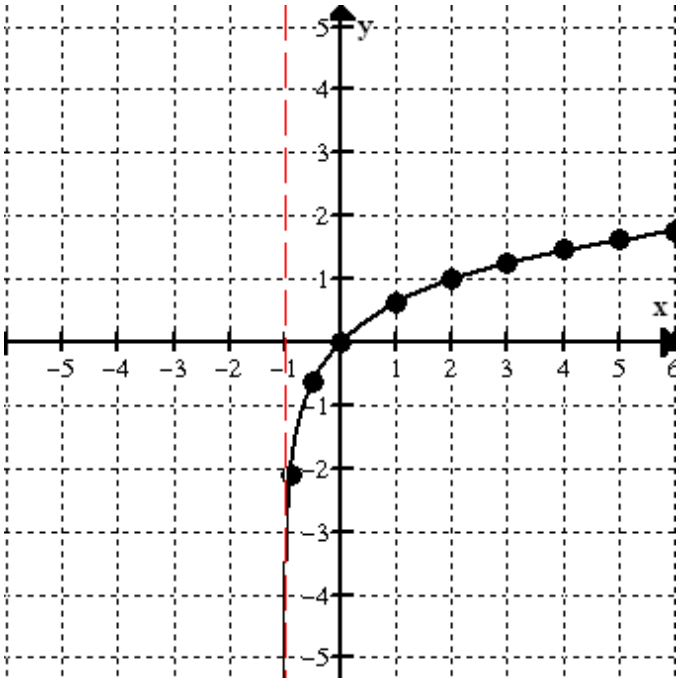
[a] What is the equation of the vertical asymptote of the graph of $f(x)$? $\boxed{x = -1}$

$$x + 1 > 0$$
$$x > -1$$

[b] Fill in the following table of values.
Choose your values of x based on your answer to [a] and the guidelines given in the graphing handout.
Round your answers to 1 decimal place.
YOU MAY USE DIFFERENT x-VALUES, BUT AT LEAST TWO OF THEM MUST BE BETWEEN –1 (THE VERTICAL ASYMPTOTE) AND 0 (THE NEXT INTEGER).

Value of x ➡	– 0.9	– 0.5	0	1	2	3
Value of $f(x)$ ➡	– 2.1	– 0.6	0	0.6	1	1.3

[c] Plot the points from [b] on the grid below, and draw the graph of $f(x)$.



PUT A BOX AROUND EACH FINAL ANSWER

Find the intensity of an earthquake with Richter magnitude 5.8. **SHOW PROPER WORK.**
Round your answer to the nearest whole number.

SCORE: ___ / 4 POINTS

$$5.8 = \log I$$
$$I = 10^{5.8} \approx \boxed{630{,}957} \text{ microns}$$

Find the exact solution of $8^{x-4} = 5^{x+3}$. **SHOW PROPER WORK. NO CREDIT FOR GUESS & CHECK.** **SCORE: ___ / 10 POINTS**
Also, use your calculator to find the decimal approximation of your exact solution, rounded to 4 decimal places.

$$\log 8^{x-4} = \log 5^{x+3}$$
$$(x-4)\log 8 = (x+3)\log 5$$
$$x\log 8 - 4\log 8 = x\log 5 + 3\log 5$$
$$x\log 8 - x\log 5 = 3\log 5 + 4\log 8$$
$$x(\log 8 - \log 5) = 3\log 5 + 4\log 8$$
$$\boxed{x = \frac{3\log 5 + 4\log 8}{\log 8 - \log 5} \approx 27.9702}$$

If you deposit $\$2900$ into an account that pays 2.17% interest annually, **SCORE: ___ / 9 POINTS**
after how many years will the value of the account be $\$3500$? **Round your answer to 2 decimal places. SHOW PROPER WORK.**

$$3500 = 2900(1+0.0217)^t$$
$$\frac{3500}{2900} = (1.0217)^t$$
$$\log\frac{35}{29} = \log 1.0217^t$$
$$\log\frac{35}{29} = t\log 1.0217$$
$$\frac{\log\frac{35}{29}}{\log 1.0217} = t$$
$\boxed{t \approx 8.76}$ years