Math 114
Midterm 3
Thu Jun 10, 2010

Name: _____

SCORE: _____ / 39 POINTS

NON-GRAPHING CALCULATORS ONLY

Let $f(x) = \log_3 \frac{x+3}{2}$.

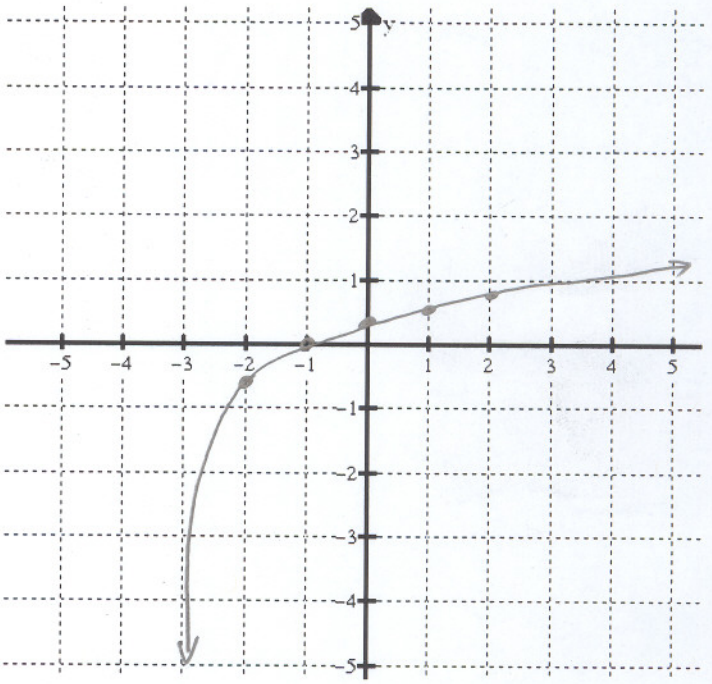
SCORE: ___ / 12 POINTS

[a] What is the equation of the vertical asymptote of the graph of $f(x)$? $\frac{x+3}{2} = 0 \Rightarrow x = -3$

[b] Fill in the following table of values. Choose your values of x based on your answer to [a]. Round your answers to 1 decimal place.

x	$f(x)$
-2	-0.6
-1	0
0	0.4
1	0.6
2	0.8

[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 5.1. **SHOW PROPER WORK.** **Round your answer to the nearest whole number.**

SCORE: ___ / 5 POINTS

$M = \log I$

$5.1 = \log I$

$I = 10^{5.1} = 125,893$

Find the exact solution of $8^{x-1} = 3^{x+2}$. **SHOW PROPER WORK.** **SCORE: ___ / 12 POINTS**

Also, use your calculator to find a decimal answer, rounded to 4 decimal places.

$$\ln 8^{x-1} = \ln 3^{x+2}$$

$$(x-1)\ln 8 = (x+2)\ln 3$$

$$x\ln 8 - \ln 8 = x\ln 3 + 2\ln 3$$

$$x\ln 8 - x\ln 3 = 2\ln 3 + \ln 8$$

$$x(\ln 8 - \ln 3) = 2\ln 3 + \ln 8$$

$$x = \frac{2\ln 3 + \ln 8}{\ln 8 - \ln 3} \approx 4.3603$$

If you deposit \$2300 into an account that pays 4.27% interest annually, **SCORE: ___ / 10 POINTS**

after how many years will the value of the account be \$3100 ? **Round your answer to 2 decimal places.** **SHOW PROPER WORK.**

$$3100 = 2300(1.0427)^t$$

$$\frac{31}{23} = 1.0427^t$$

$$\ln\frac{31}{23} = t\ln 1.0427$$

$$t = \frac{\ln\frac{31}{23}}{\ln 1.0427} \approx 7.14$$