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

Name: _____

SCORE: _____ / 35 POINTS

NON-GRAPHING CALCULATORS ONLY

Let $f(x) = \log_4(x-2)$.

SCORE: ___ / 12 POINTS

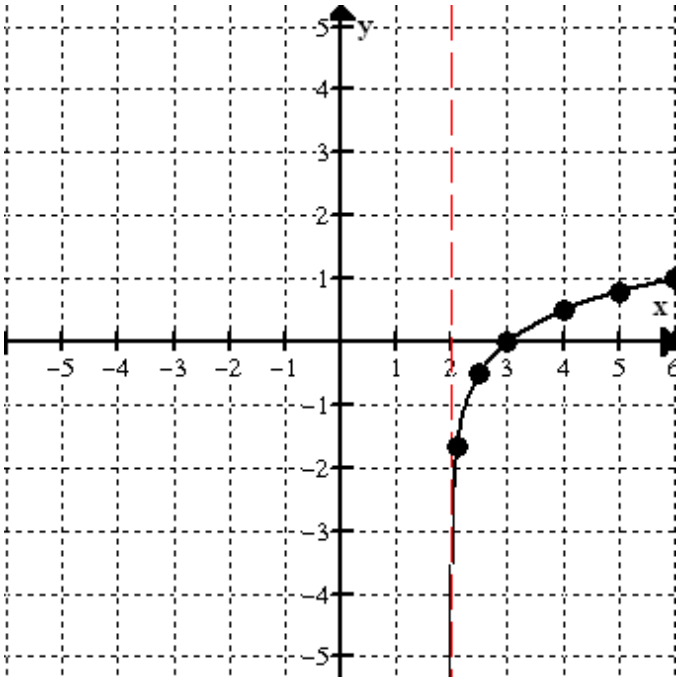
[a] What is the equation of the vertical asymptote of the graph of $f(x)$? $\boxed{x = 2}$

$x - 2 > 0$
$x > 2$

[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 ➡	2.1	2.5	3	4	5	6
Value of $f(x)$ ➡	– 1.6	– 0.5	0	0.5	0.8	1

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

SCORE: ___ / 4 POINTS

$6.2 = \log I$
$I = 10^{6.2} \approx \boxed{1{,}584{,}893}$ microns

Find the exact solution of $9^{x-4} = 4^{x+3}$. **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.

$$\log 9^{x-4} = \log 4^{x+3}$$
$$(x-4)\log 9 = (x+3)\log 4$$
$$x\log 9 - 4\log 9 = x\log 4 + 3\log 4$$
$$x\log 9 - x\log 4 = 3\log 4 + 4\log 9$$
$$x(\log 9 - \log 4) = 3\log 4 + 4\log 9$$
$$\boxed{x = \frac{3\log 4 + 4\log 9}{\log 9 - \log 4} \approx 15.9666}$$

If you deposit $\$1900$ into an account that pays 2.67% interest annually, **SCORE: ___ / 9 POINTS**
after how many years will the value of the account be $\$2200$? **Round your answer to 2 decimal places. SHOW PROPER WORK.**

$$2200 = 1900(1+0.0267)^t$$
$$\frac{2200}{1900} = (1.0267)^t$$
$$\log\frac{22}{19} = \log 1.0267^t$$
$$\log\frac{22}{19} = t\log 1.0267$$
$$\frac{\log\frac{22}{19}}{\log 1.0267} = t$$
$\boxed{t \approx 5.56}$ years