Math 114
Midterm 3
Wed Jun 10, 2009

Name: _____

SCORE: _____ / 38 POINTS

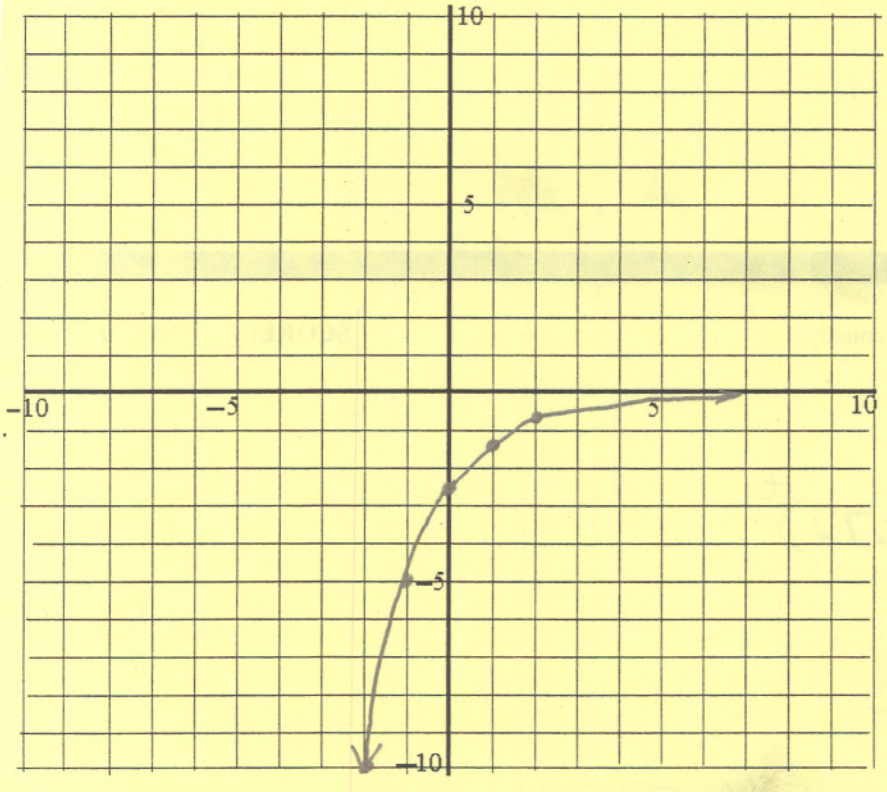
- ALL PROBLEMS MUST BE SOLVED ALGEBRAICALLY TO EARN CREDIT
- PUT A BOX AROUND EACH FINAL ANSWER
- SHOW COMPLETE AND PROPER WORK TO EARN FULL CREDIT

ONLY SCIENTIFIC CALCULATORS ALLOWED
NO GRAPHING CALCULATORS ALLOWED

Draw the graph of $f(x) = -5 \cdot 2^{-(x+1)}$ by finding and plotting functions values, and connecting to get the shape of the graph. Show the function values of at least 5 points on your graph in the table below.
LABEL ALL ASYMPTOTES CLEARLY.

SCORE: ___ / 12 POINTS

x	−2	−1	0	1	2
$f(x)$	−10	−5	−2.5	−1.25	−0.625



← HORIZONTAL ASYMPTOTE $y = 0$

Find the Richter magnitude of an earthquake of intensity 840,000 microns.

SCORE: ___ / 4 POINTS

$M = \log 840{,}000$

$\boxed{M = 5.9}$

Find the exact solution of $7^{x-1} = 3^{x+2}$. Also, use your calculator to find a decimal answer, rounded to 4 decimal places.

SCORE: ___ / 12 POINTS

$$\log 7^{x-1} = \log 3^{x+2}$$
$$(x-1)\log 7 = (x+2)\log 3$$
$$x\log 7 - \log 7 = x\log 3 + 2\log 3$$
$$x\log 7 - x\log 3 = \log 7 + 2\log 3$$
$$x(\log 7 - \log 3) = \log 7 + 2\log 3$$
$$x = \boxed{\frac{\log 7 + 2\log 3}{\log 7 - \log 3}} \approx \boxed{4.8898}$$

If you deposit \$600 into an account that pays 3.72% interest annually, when will the value of the account be \$1100 ?

SCORE: ___ / 10 POINTS

$$A = P(1+r)^t$$
$$1100 = 600(1+0.0372)^t$$
$$\frac{11}{6} = 1.0372^t$$
$$\log \frac{11}{6} = t \log 1.0372$$
$$t = \frac{\log \frac{11}{6}}{\log 1.0372} \approx 16.595$$

THE VALUE OF THE ACCOUNT WILL BE \$1100 AFTER 16.595 (OR 17) YEARS