Math 114 Midterm 3
10:30am Class – Calculator Portion Version E
Tue Nov 26, 2013

NAME YOU ASKED TO BE CALLED IN CLASS: _____

SCORE: ____ / 29 POINTS **ONLY NON-GRAPHING CALCULATORS ALLOWED**

Let $f(x) = \log_3(4x+8)$. **SCORE: ____ / 10 PTS**

[a] What is the domain of $f(x)$? **SHOW PROPER WORK.**

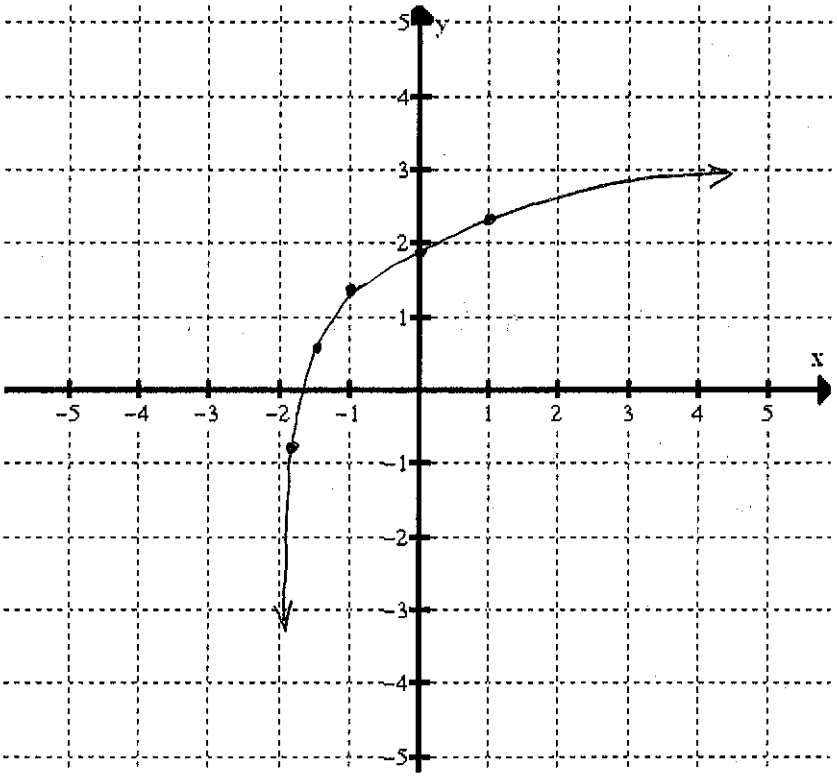
$4x+8>0$
$4x>-8$
$x>-2$

[b] What is the **equation** of the asymptote of $f(x)$? $x=-2$

[c] Fill in the following table of values.
Choose your values of x based on the guidelines given in the graphing handout on my website.
Round your answers to 1 decimal place.

Value of x ➡	-1.9	-1.5	-1	0	1
Value of $f(x)$ ➡	-0.8	0.6	1.3	1.9	2.3

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



ADDITIONAL QUESTIONS ON OTHER SIDE ➡

- YOU MUST SHOW LOGICAL, NEAT AND ORGANIZED WORK TO EARN FULL CREDIT (NO GUESS & CHECK)
- IT MUST BE CLEAR HOW YOU ARRIVED AT YOUR ANSWER

➡➡➡➡ PUT EACH FINAL ANSWER IN THE SPACE PROVIDED ⬅⬅⬅⬅

Solve for x: $7^{3x+1} = 9^{2x-5}$. **SHOW PROPER WORK. CHECK YOUR ANSWER(S).** **SCORE: ____ / 10 PTS**

$\log 7^{3x+1} = \log 9^{2x-5}$

$(3x+1)\log 7 = (2x-5)\log 9$

$(3\log 7)x + \log 7 = (2\log 9)x - 5\log 9$

$(3\log 7)x - (2\log 9)x = -5\log 9 - \log 7$

$(3\log 7 - 2\log 9)x = -5\log 9 - \log 7$

$x = \dfrac{-5\log 9 - \log 7}{3\log 7 - 2\log 9} \approx -8.96$

$7^{3(-8.96)+1} \approx 1.345 \times 10^{-22}$

$9^{2(-8.96)-5} \approx 1.345 \times 10^{-22}$

FINAL ANSWER: $x = -8.96$

Bo took out \$31,000 in student loans at 6.84% interest compounded monthly. **SCORE: ____ / 9 PTS**

If no payments were made, how long did it take for the total amount owed to reach \$47,000 ? **Round your answer to 2 decimal places.**

$47000 = 31000\left(1 + \dfrac{0.0684}{12}\right)^{12t}$

$\dfrac{47000}{31000} = (1.0057)^{12t}$

$\log \frac{47}{31} = 12t \log 1.0057$

$t = \dfrac{\log \frac{47}{31}}{12 \log 1.0057} \approx 6.10$

FINAL ANSWER IN SENTENCE FORM: IT WILL TAKE 6.10 YEARS FOR THE TOTAL TO REACH \$47,000