

SCORE: \_\_\_\_ / 29 POINTS

**ONLY NON-GRAPHING CALCULATORS ALLOWED**Let  $f(x) = \log_2(3x+15)$ .

SCORE: \_\_\_\_ / 10 PTS

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

$$\begin{aligned}
 3x+15 &> 0 \\
 3x &> -15 \\
 x &> -5
 \end{aligned}$$

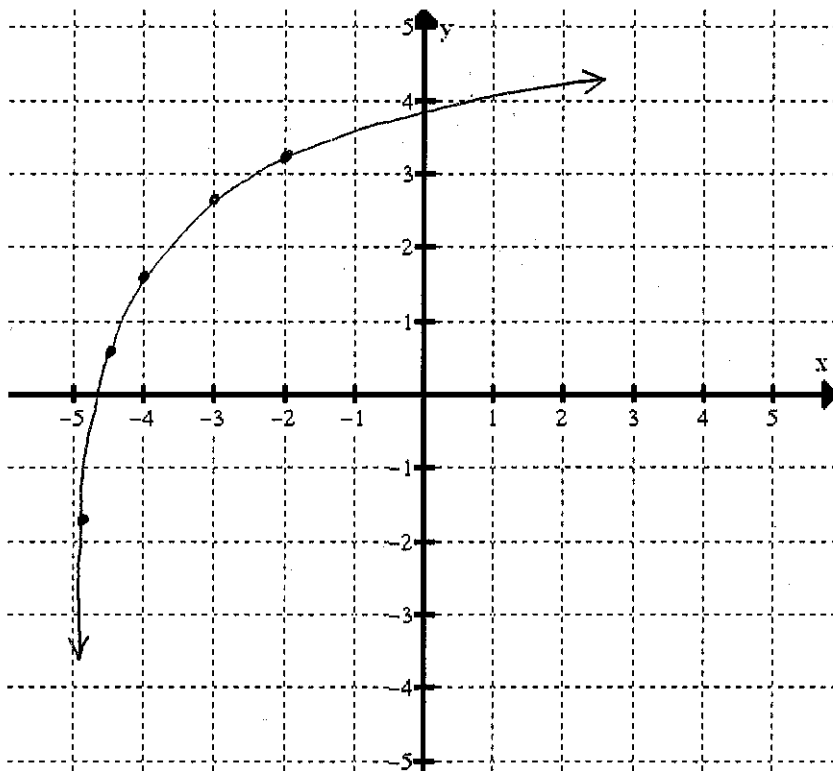
- [b] What is the
- equation
- of the asymptote of
- $f(x)$
- ?
- $x = -5$

- [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 $x \rightarrow$	-4.9	-4.5	-4	-3	-2
Value of $f(x) \rightarrow$	-1.7	0.6	1.6	2.6	3.2

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

**ADDITIONAL QUESTIONS ON OTHER SIDE →**

➡➡➡➡ 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

$$\begin{aligned}\log 7^{3x+1} &= \log 9^{2x-5} \\ (3x+1) \log 7 &= (2x-5) \log 9 \\ (3 \log 7)x + \log 7 &= (2 \log 9)x - 5 \log 9 \\ (3 \log 7)x - (2 \log 9)x &= -5 \log 9 - \log 7 \\ (3 \log 7 - 2 \log 9)x &= -5 \log 9 - \log 7 \\ x &= \frac{-5 \log 9 - \log 7}{3 \log 7 - 2 \log 9} \approx -8.96\end{aligned}$$

$$\begin{aligned}7^{3(-8.96)+1} &\approx 1.345 \times 10^{-22} \\ 9^{2(-8.96)-5} &\approx 1.345 \times 10^{-22}\end{aligned}$$

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.

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

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

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

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

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