

SCORE: _____ / 39 POINTS

NON-GRAPHING CALCULATORS ONLY

Let $f(x) = \log_2 \frac{x-1}{3}$.

SCORE: ____ / 12 POINTS

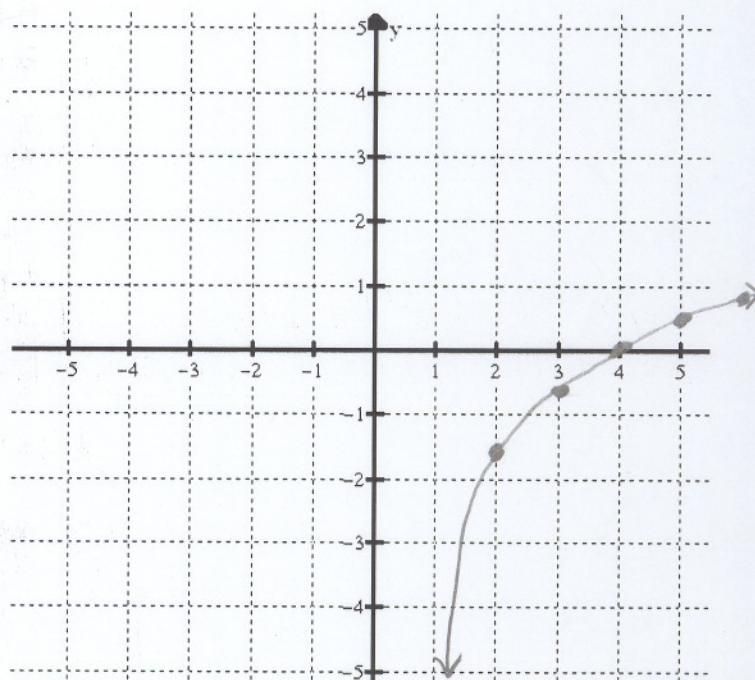
- [a] What is the equation of the vertical asymptote of the graph of $f(x)$? $x = 1$

DOMAIN $\frac{x-1}{3} > 0 \Rightarrow x > 1$

- [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	$\log_2 \frac{1}{3} = \frac{\log \frac{1}{3}}{\log 2} \approx -1.6$
3	$\log_2 \frac{2}{3} \approx -0.6$
4	$\log_2 1 = 0$
5	$\log_2 \frac{4}{3} \approx 0.4$
6	$\log_2 \frac{5}{3} \approx 0.7$

- [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 4.3. SHOW PROPER WORK.
Round your answer to the nearest whole number.

SCORE: ____ / 5 POINTS

$$4.3 = \log I$$

$$I = 10^{4.3}$$

$$I = \boxed{19,953 \text{ microns}}$$

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

SCORE: ___ / 12 POINTS

$$\ln 7^{x-2} = \ln 3^{x+1}$$

$$(x-2)\ln 7 = (x+1)\ln 3$$

$$x\ln 7 - 2\ln 7 = x\ln 3 + \ln 3$$

$$x\ln 7 - x\ln 3 = \ln 3 + 2\ln 7$$

$$x(\ln 7 - \ln 3) = \ln 3 + 2\ln 7$$

$$x = \frac{\ln 3 + 2\ln 7}{\ln 7 - \ln 3} \approx 5.8898$$

If you deposit \$1100 into an account that pays 5.83% interest annually,
after how many years will the value of the account be \$1900? Round your answer to 2 decimal places. SHOW PROPER WORK.

SCORE: ___ / 10 POINTS

$$1900 = 1100(1 + 0.0583)^t$$

$$1900 = 1100(1.0583)^t$$

$$\frac{19}{11} = 1.0583^t$$

$$\ln \frac{19}{11} = t \ln 1.0583$$

$$t = \frac{\ln \frac{19}{11}}{\ln 1.0583} \approx \boxed{9.65 \text{ YEARS}}$$