Name: _____ Date: _____ Class: _____

# Graphing Logarithmic Functions as the Inverses of Exponential Functions

**Steps:**

exponentials - Horizontal asymptote

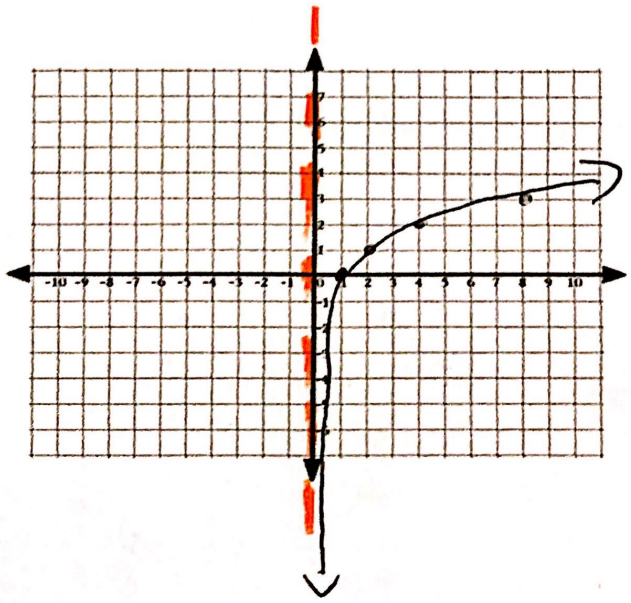
1. Re-write function as $f(x) = \frac{\log(arguement)}{\log(base)}$ (number or parenthesis)
2. Type into table in calculator.
3. Graph points from table.

**Examples:**

1. $f(x) = \log_2(x)$

$$f(x) = \frac{\log(x)}{\log(2)}$$

| x | y |
|---|---|
| 1 | 0 |
| 2 | 1 |
| 4 | 2 |
| 8 | 3 |
| | |



Domain $(0, \infty)$

Range $(-\infty, \infty)$

y-intercept none (to ∞ →)

asymptote $x = 0$

logarithms - Vertical asymptote

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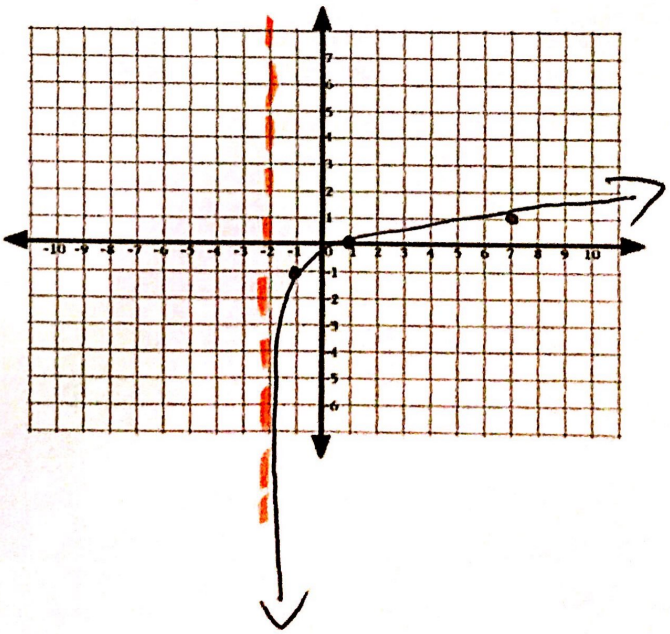
Change the sign

2. $f(x) = \log_3(x+2) - 1$

$$f(x) = \frac{\log(x+2)}{\log(3)} - 1$$

| x | y |
|---|---|
| -1 | -1 |
| 0 | -.36 |
| 1 | 0 |
| 7 | 1 |
| | |



Domain $(-2, \infty)$

Range $(-\infty, \infty)$ (ys)

y-intercept $-.36$

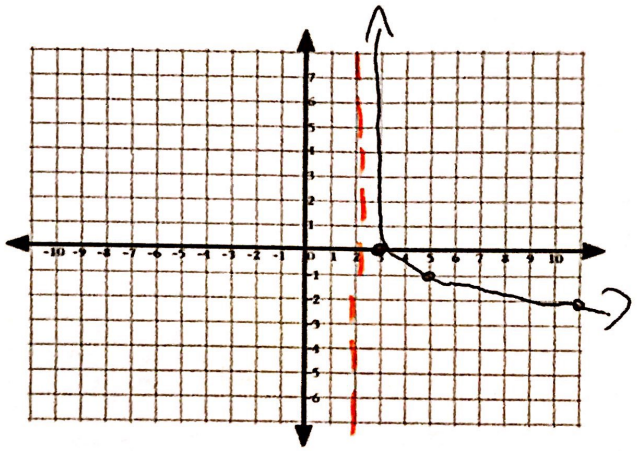
asymptote $x = -2$

Change the sign

**3.** $f(x) = \log_{\frac{1}{3}}(x-2)$

$f(x) = \dfrac{\log(x-2)}{\log\left(\frac{1}{3}\right)}$

| x | y |
|---|---|
| 3 | 0 |
| 5 | -1 |
| 11 | -2 |
| | |
| | |



Domain $(2, \infty)$

Range $(-\infty, \infty)$

y-intercept none

asymptote $x = 2$

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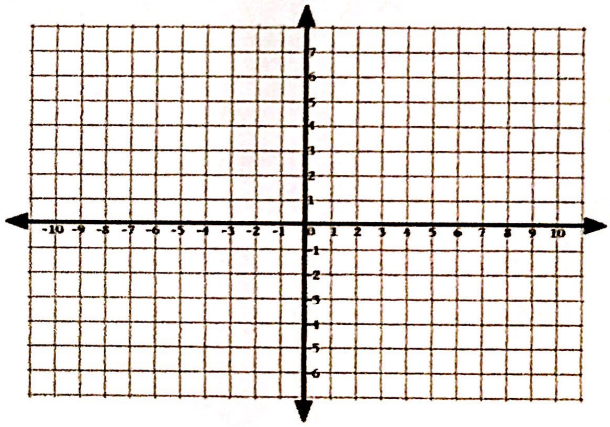
**4.** $f(x) = log_5(x+2) - 1$

$f(x) =$

| x | y |
|---|---|
| -3 | |
| -2 | |
| -1 | |
| 0 | |
| 1 | |



Domain _____

Range _____

y-intercept _____

asymptote _____

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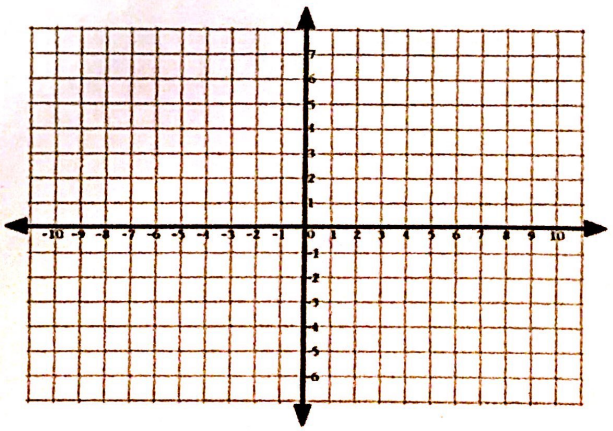
**5.** $f(x) = \ln(x) + 3$

May be decimals

$f(x) = \ln(x) + 3$

| x | y |
|---|---|
| | |
| | |
| | |
| | |
| | |



Domain _____

Range _____

y-intercept _____

asymptote _____