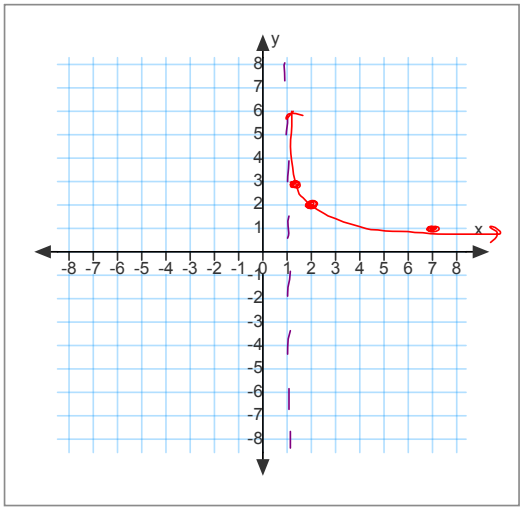
# Warm up

Sketch by hand.

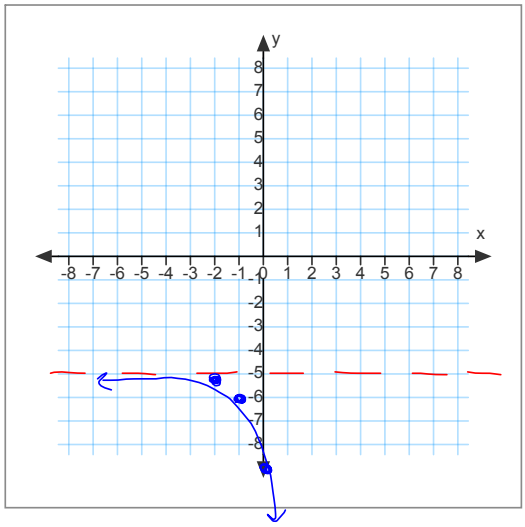
1. $y = -\log_6(x-1)+2$




| x | y |
|---|---|
| 1/6 | +1 |
| 1 | 0 |
| 6 | -1 |

| x | y |
|---|---|
| 1/6 | 3 |
| 2 | 2 |
| 7 | 1 |

2. $y = -4^{x+1} - 5$




| x | y |
|---|---|
| -1 | -1 1/4 |
| 0 | -1 |
| 1 | -4 |

| x | y |
|---|---|
| -2 | -5 1/4 |
| -1 | -6 |
| 0 | -9 |

$0 = -\log_6(x-1)+2$

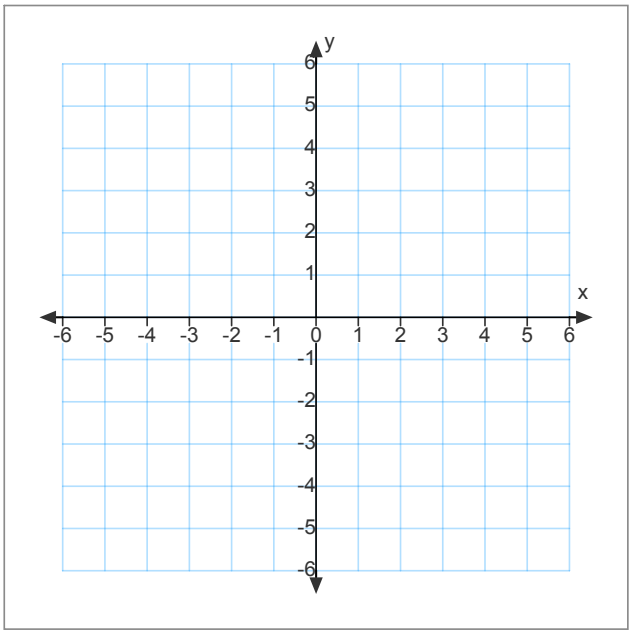
$-2 =$

$2 = \log_6(x-1)$

$6^2 = (x-1)$

GO COUGARS!

# Homework Questions



# 3.2 Logarithmic Functions and Their Graphs

Day 2

exp ⟶ log ⟶ exp

evaluate

properties of logs

Rewrite from exponential form to log form

$x = a^y$ Drop, criss, cross

$y = \log_a x$

$\log_a x = y$

# Rewrite in log form

$3 = 4^x$

$\log_4 3 = x$

$x = 5^2$

$\log_5 x = 2$

$\log_{10} 3 = 4$

$4 = x^3$

$\log_x 4 = 3$

$e^x = 3$

$\ln 3 = x$

$\log_e 3 = x$

$\ln 3 = x$

# Rewrite in exponential form

$\log_x 4 = 7$ $x^7 = 4$

$\log 3 = x$ $10^x = 3$

$\log_2 x = 4$ $2^4 = x$

$\ln 5 = x$ $e^x = 5$

log equation in general $y = \log_a x$

Rewrite in exponential form

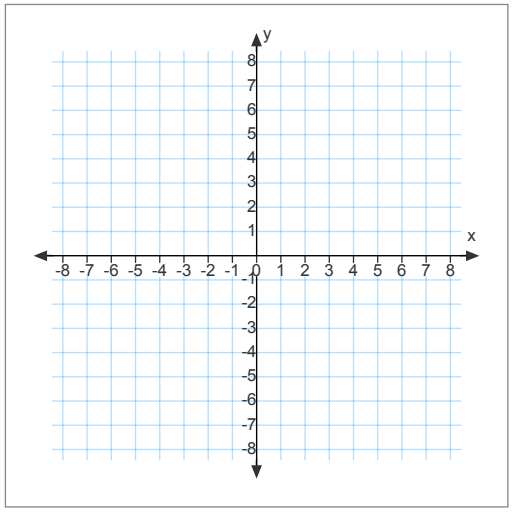
$\log_2 8 = 3$ $2^3 = 8$

$\log_2 4 = 2$

$\log_2 1 = 0$ $2^0 = 1$

$\log_2 2 = 1$ $2^1 = 2$

What does it mean????




$\log_3 27 = 3$

what power — do I raise 3 to — to get 27

$\log_4 64 = 3$

$\log_2 64 = 6$

$\log_2 \frac{1}{4}$

$-2$

# Using logs to evaluate

$y = \log_2 8$

$y = 3$

$y = \log_3 1$

$y = 0$

$y = \log_{10} \frac{1}{1000}$ $y = -3$

# Properties of Logs

$\log_a 1 = 0$ $\log_7 1$ $\log_{16} 1$ $\longrightarrow$ $a^0 = 1$

$\log_a a = 1$ $\log_6 6$ $\log_9 9$ $\longrightarrow$ $a^1 = a$

$\log_a a^x = x$ $\longrightarrow$ $a^x = a^x$

$a^{\log_a x} = x$ $\longrightarrow$ $\log_a x = \log_a x$ $x = x$

If $\log_a x = \log_a y$

Then $x = y$

$\ln 1 = 0$ $\log_e 1 = 0$ $\longrightarrow$ $e^0 = 1$

$\ln e = 1$ $\log_e e = 1$ $\longrightarrow$ $e^1 = e$

$\ln e^x = x$ $\longrightarrow$ $e^x = e^x$

$e^{\ln x} = x$ $\longrightarrow$ $x = x$

If $\ln x = \ln y$

Then $x = y$

Now that we have these properties, let's revisit our evaluation problems.

$y = \log_2 8$

$y = 3$

$y = \log_5 25$

$y = 2$

$y = \log_{10} \frac{1}{1000}$

$y = -3$

$y = \log_7 \frac{1}{49}$

$y = -2$

$y = \log_3 1$

$y = 0$

$y = \log_{12} 12$

$y = 1$

$y = \ln 1$

$y = 0$

$y = \ln e$

$y = 1$

If no base is written for a common logarithmic expression it is understood to be 10!

- common log base 10 is what calculator uses

- e is the base for natural logs

$\ln \pi$

$\log 15$

Evaluate the following using your calculator

$\log 6$

.778

$\log 10$

1

$\log(-3)$

NS

$\ln 4$

1.386

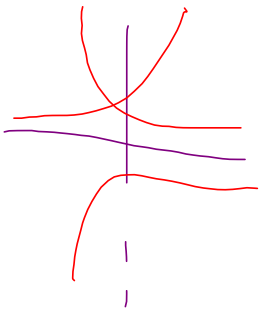
$\ln e$

1

# HOMEWORK

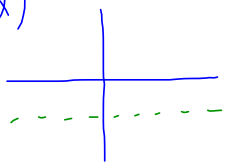
p 203 1-19 odd, 25-41 odd,

63-69 odd



$y = -2\log_3(2x-1)+4$

$y = -\frac{1}{3}(2)^{-x+4} - 3$




$(0, -\frac{1}{3})$ $(0,1)$ $-\frac{1}{3}$

$(1, -\frac{2}{3})$ $(1,2)$ $-\frac{2}{3}$

$y = -3(4)^{-2x+6} + 2$