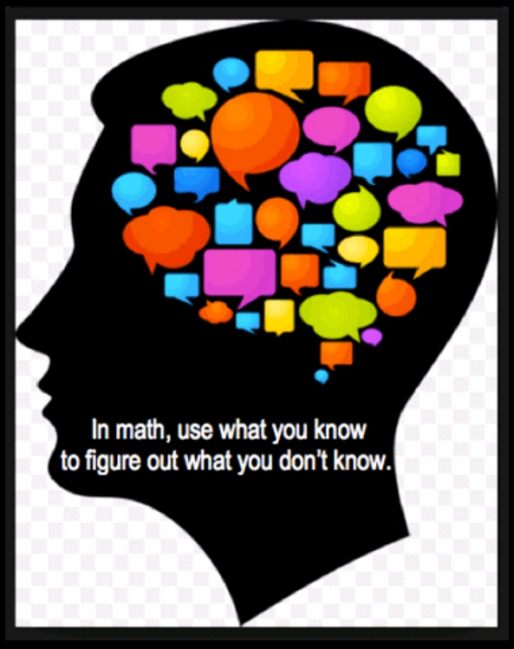


Again, use what you know about transformations to graph logarithmic functions.

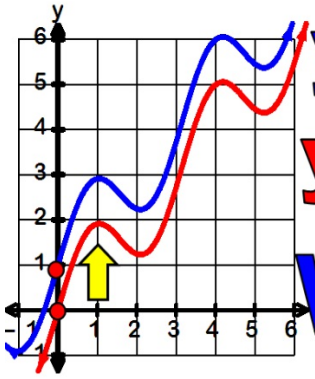
+/- after function moves up/down

+/- within function moves left/right

a -x...flips over y

a negative in front...flips over x

Translations

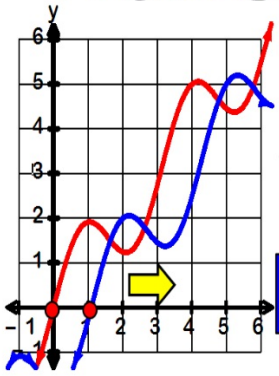


$y=f(x)+A$

$y=f(x)$

Vert Shift

Translations

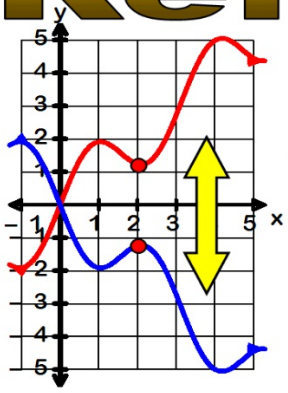


$y=f(x-A)$

$y=f(x)$

Horo Shift

Reflect

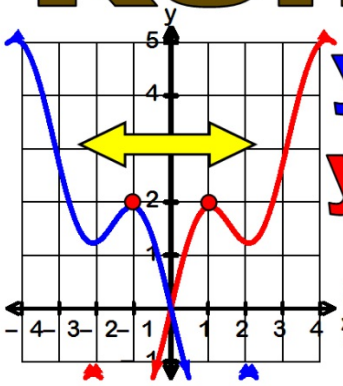


y=-f(x)

y=f(x)

in x axis

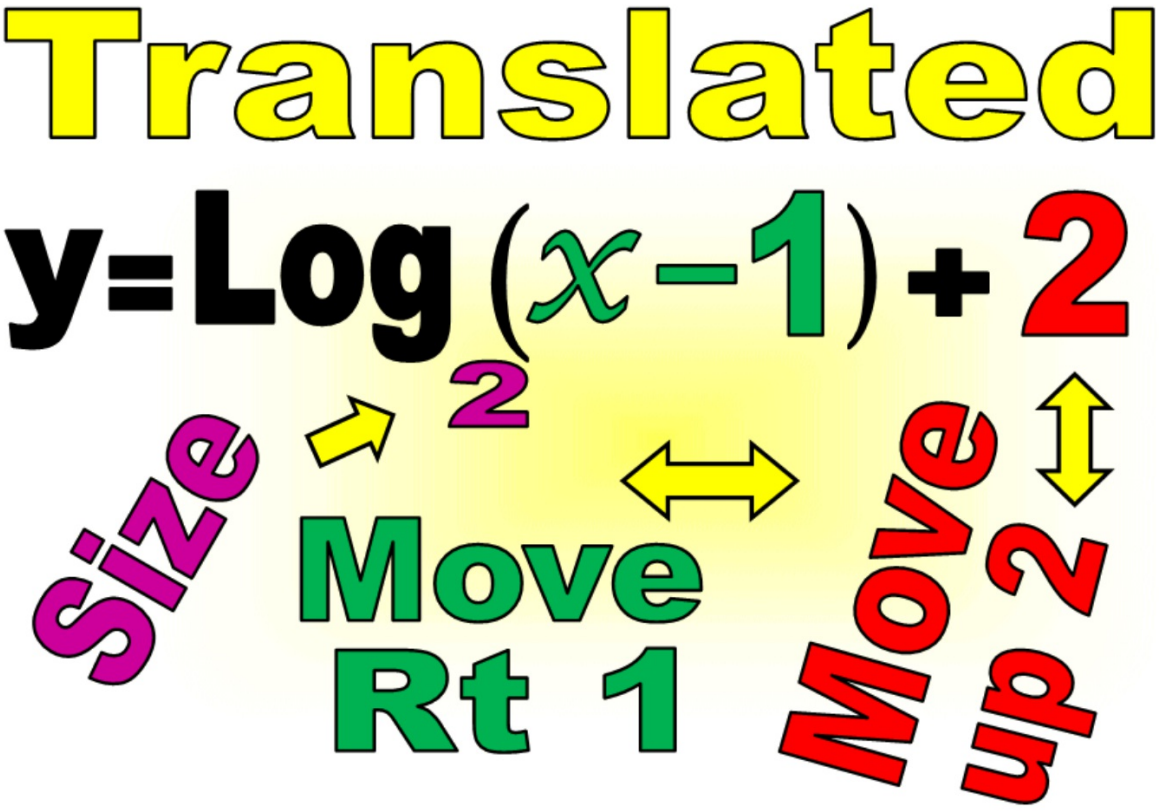
Reflect



y=f(-x)

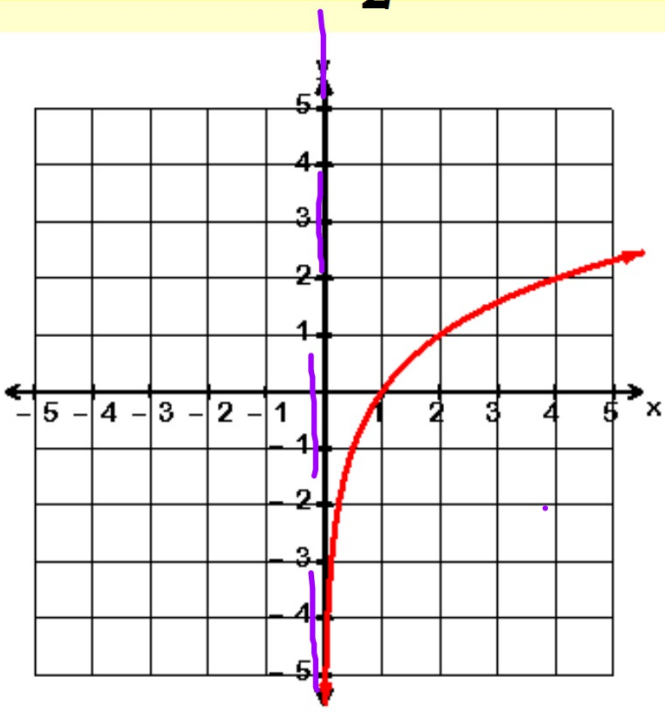
y=f(x)

in y axis


Translated
y=Log(x−1)+2
Size
2
Move
Rt 1
Move
up 2

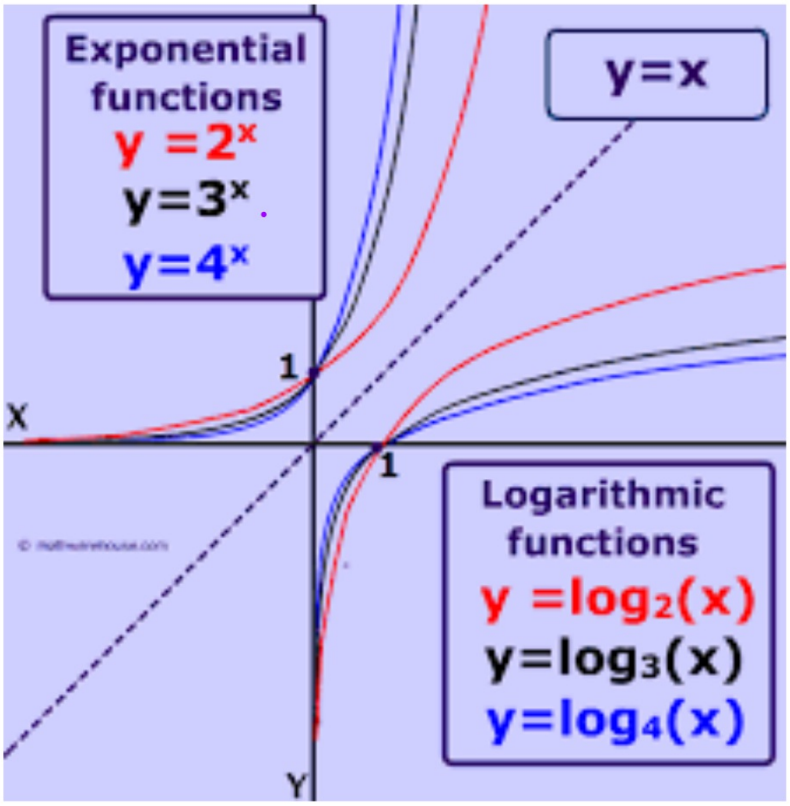
Graph of y = log x
Basic shape-
domain (0,∞)
range- (-∞,∞)
x-intercept@ (1,0)
no y-intercept
VA at x = 0

$y = \log_2 x$



$x = 0$

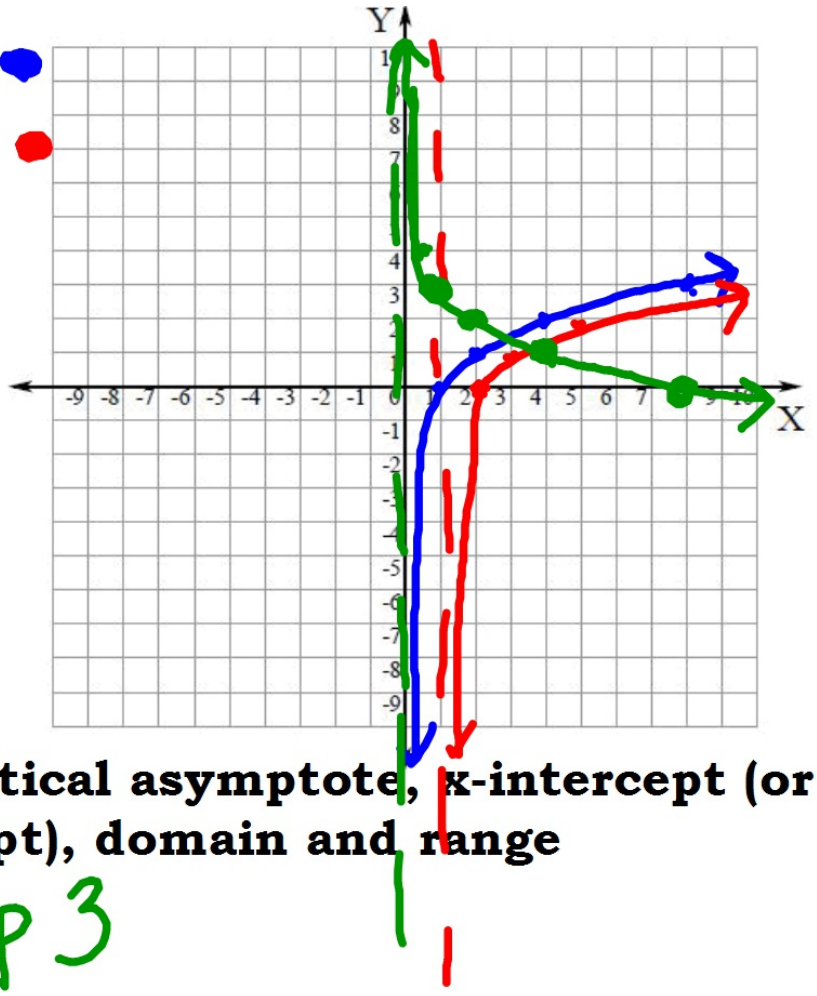
By the way… logarithmic functions are inverses to exponential….so their graphs have symmetry about y = x.



Sketch $y = \log_2 x$

with $y = \log_2(x-1)$

and $y = -\log_2 x + 3$



- VA @ x = 1

d: $(1, \infty)$

r: $\mathbb{R}$

Determine the vertical asymptote, x-intercept (or translated intercept), domain and range

- flipped & up 3

VA @ x = 0

d: $(0, \infty)$ r: $\mathbb{R}$

Determine the domain, range and vertical asymptote of:

1. $y = \log x + 1$ **moved up 1**
d:(0,inf), r: all reals VA @ x = 0

2. $y = \log (x+1)$ **moved left one**
d(-1,inf) r: all reals VA @ x = -1

3. $y = -\log x$ **flipped upside-down**
d:(0,inf), r: all reals VA @ x = 0

4. $y = \log (-x)$ **flipped over the y-axis**
d:(-inf,0), r: all reals VA @ x = 0

5. $y = \log x - 3$

moved down 3
d:(0,inf) r: all reals VA @ x = 0

Only translations moving left or right will affect the vertical asymptote. So, the arugment, or expression in parenthesis (like #2) will have to be changes.

Suggested Practice
Sec 4.2
page 466
47-52 matching
odds 53-65, 73

Sec 4.2

47. $1-\log_3 x$

48 $\log_3(-x)$

49. $\log_3 x - 1$

50. $-\log_3 x$

51. $\log_3(x-1)$

52. $\log_3 x$ graph solutions see back of text plus

53. VA @ $x=-1$
d: $(-1,\infty)$
r: $(-\infty,\infty)$ ←

55. VA @ $x=0$ ←
d: $(0,\infty)$
r: $(-\infty,\infty)$ ←

57. Same ↑