

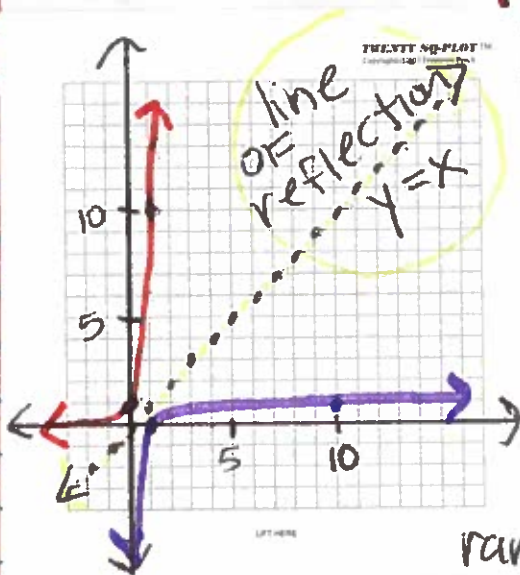
Day 7

8.3 Notes...

Graphing Logarithms

A logarithmic function is the inverse of an exponential function.

The inverse of $y=10^x$ is $y=\log_{10}x$



x	y=10 ^x	x	y=log ₁₀ x
0	10 ⁰ =1	1	0
1	10 ¹ =10	10	1

domain

$$D: (-\infty, \infty)$$

$$R: (0, \infty)$$

range

Horizontal asymptote
because $y=0$ (x-axis)

$$D: (0, \infty)$$

$$R: (-\infty, \infty)$$

vertical asymptote

$$y\text{-axis: } x=0$$

Domain: x-values
Range: y-values

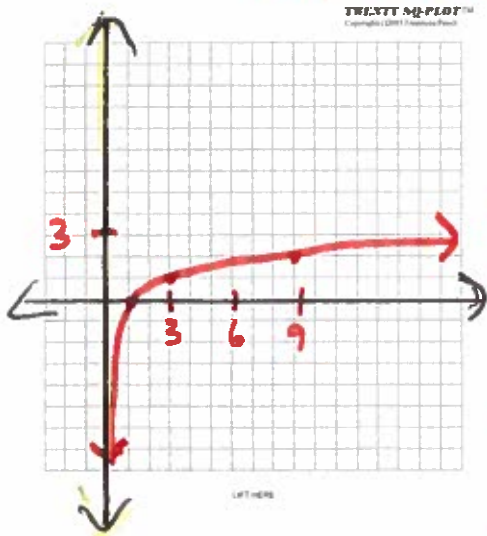
ex 2 Graph $y = \log_3 x$

* inverse of $y = 3^x$

older calculator

$$y = \log(x) \div \log(3)$$

new calc: **alpha window 5**



X	Y
0	ERROR
1	0
3	1
9	2

vertical asymptote $x = 0$ (y-axis)

$D: (0, \infty)$ $R: (-\infty, \infty)$
↑ Parenthese ↑ always

Parent Function: $y = \log_b x$

$$y = a \log_b (x - h) + k$$

negative reflection

SHIFT LEFT/right

SHIFTs up/down

ex3

$$y = \log(x-3) + 2$$

← up 2

→ right 3 → $x-3=0$

→

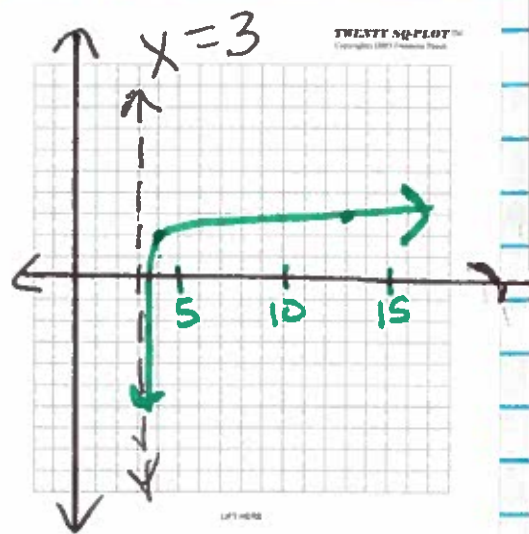
$$\begin{array}{r} +3 -3 \\ x=3 \end{array}$$

Vertical asymptote

$x=3$

D: $(3, \infty)$
R: $(-\infty, 3)$

x	y
3	error
3.1	1
4	2
13	3



ex4 $y = \log_6(x-1) - 3$

shifts: right 1, down 3

V. Asymp: $x=1$

old calculator

$$y = \log(x-1) \div \log(6) - 3$$

D: $(1, \infty)$
R: $(-\infty, 1)$

x	y
1	error
2	-3
7	-2
37	-1

