Graphing Logs Notes

remember exponential equations and logs are inverses of each other

ling the parent function key points

ex 1.

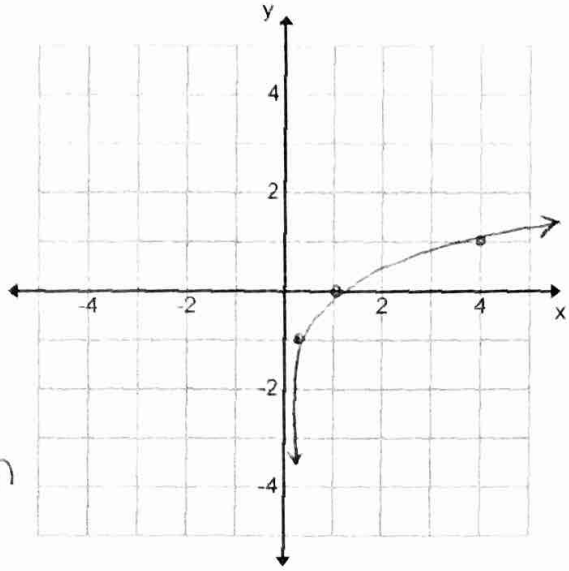
$y = 4^x$

X	Y
-1	1/4
0	1
1	4

Now graph $y = \log_4 x$

X	Y
1/4	-1
1	0
4	1

graph



Domain: $(0, \infty)$ Range: $(-\infty, \infty)$ Asymptote: $x = 0$ (y-axis)

x-int
rcept: $(1, 0)$ End Behavior: $x \to \infty$, $y \to \infty$ ☆
$x \to 0$, $y \to -\infty$
asym.

ex 2.

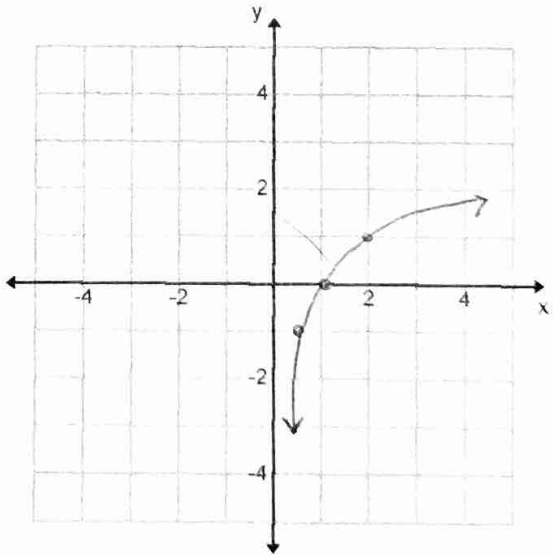
Graph $y = \log_2 x$

X	Y
-1	1/2
0	1
1	2

$y = 2^x$

X	Y
1/2	-1
1	0
2	1

$y = \log_2 x$



Domain: $(0, \infty)$ Range: $(-\infty, \infty)$ Asymptote: $x = 0$

Intercept: $(1, 0)$ End Behavior: $x \to \infty$, $y \to \infty$
$x \to 0$, $y \to -\infty$

Overall Graphing Rules

$$y = a\log_{base}\left(\frac{x-h}{b}\right)+k$$

a: vertical dilation
→ multiply by y's

b: horizontal dilation
→ multiply by x's

h: left/right movement

k: up/down movement

base:

X	Y
1/8	-1
1	0
8	1

$\log_8 x$

List the transformations of the following

1. $y = 2\log_4(x+1)$

2. $y = \log\left(\frac{x}{3}\right) - 4$

3. $y = -\log_2(3x) + 1$

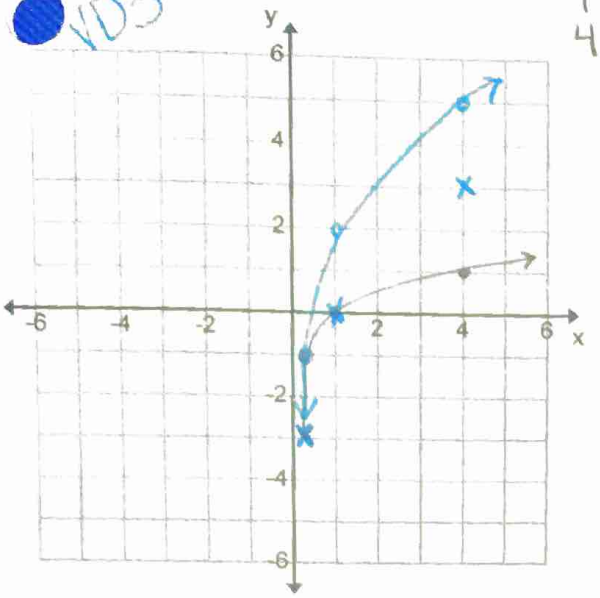
Graph each example

1. $y = 3\log_4 x + 2$ V2

HD3

$\log_4 x$

X	Y
1/4	-1
1	0
4	1



D: $(0, \infty)$ A: $x = 0$

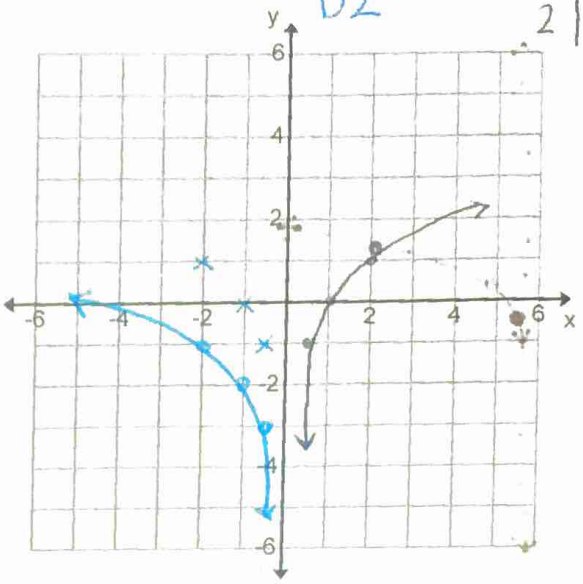
R: $(-\infty, \infty)$ EB: $x \to \infty$ $y \to \infty$
$x \to 0$ $y \to -\infty$

Over y-axis

2. $y = \log_2(-x) - 2$ D2

$\log_2 x$

X	Y
1/2	-1
1	0
2	1



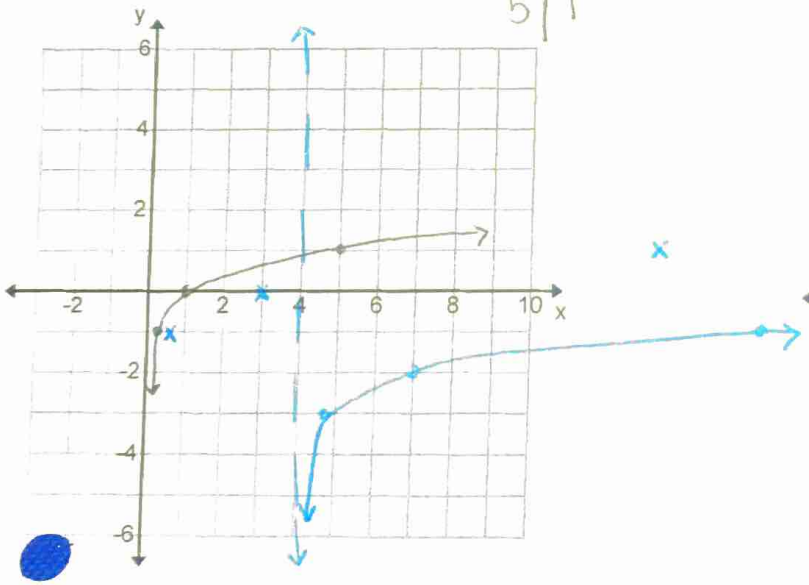
D: $(-\infty, 0)$ A: $x = 0$

R: $(-\infty, \infty)$ EB: $x \to -\infty$, $y \to \infty$
$x \to 0$, $y \to -\infty$

3. $y = \log_5\left(\frac{x-4}{3}\right) - 2$ R4 D2 HD3

$\log_5 x$

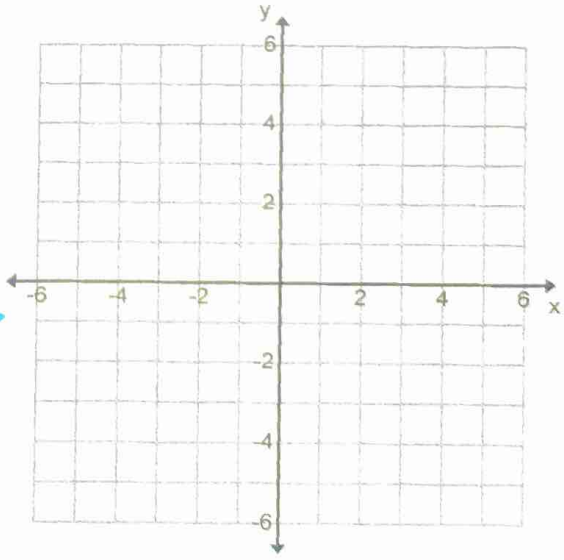
X	Y
1/5	-1
1	0
5	1



D: $(4, \infty)$ A: $x = 4$

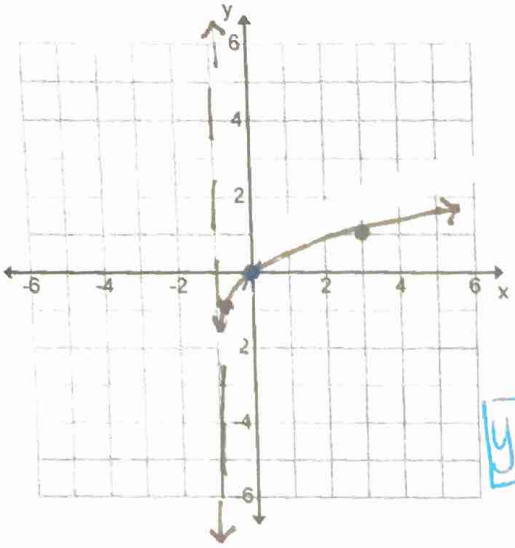
R: $(-\infty, \infty)$ EB: $x \to \infty$ $y \to \infty$
$x \to 4$ $y \to -\infty$

4. $y = -\frac{1}{2}\log_3(x+3) - 4$



Given the graphs, find the equation

5. Base 4



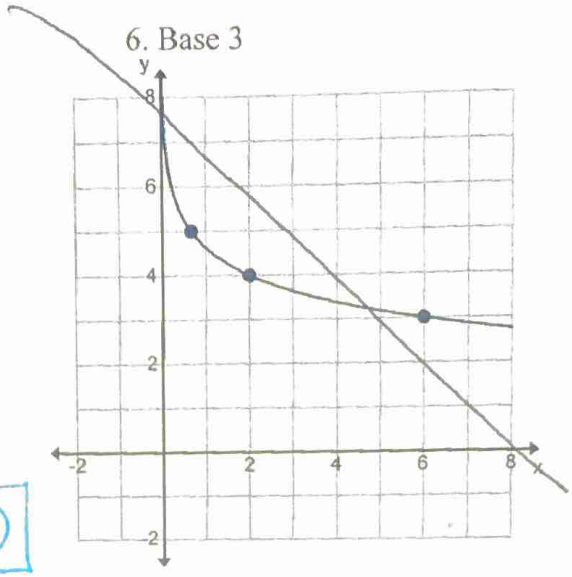
$\boxed{y = \log_4(x+1)}$

① reflections → shape none

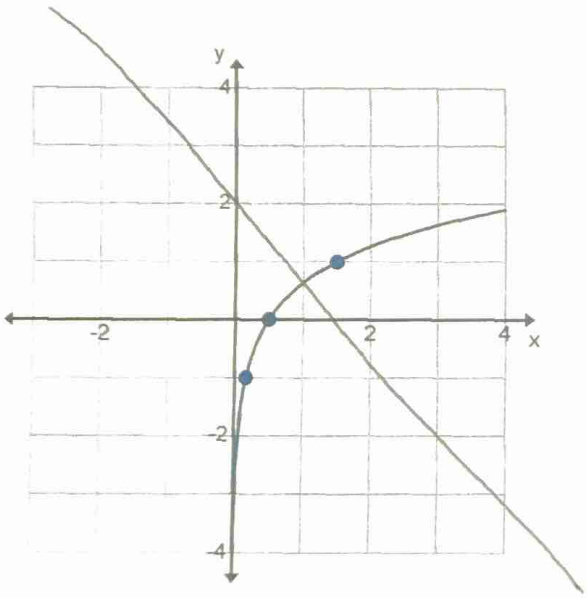
② L/R → asymptote L1

③ U/D → middle pt should be on x-axis none

6. Base 3



7. Base 3



8. Base 2