General Rules For Graphing Exponents

Vocab:

- c represents the **base** of the graph. This changes from graph to graph and determines the key points y-values.
  - X values are always -1, 0, 1

$$y = a(c)^{\frac{(x-h)}{b}} + k$$

a: vertical dilation, multiply y's

$\boxed{\text{ex}}$ $y = 3(2)^x \rightarrow$ VD by 3

→ on a graph I look @ spaces btwn asymp. & middle pt

b: horizontal dilation, multiply x's

$\boxed{\text{ex}}$ $y = 2^{x/4} \rightarrow$ HD by 4

→ on a graph I look @ spaces btwn all the pts

h: left/right movement, L +, R −, opposite of what you see

→ to find the eq look @ middle pt. (should be on y-axis)

k: up/down movement

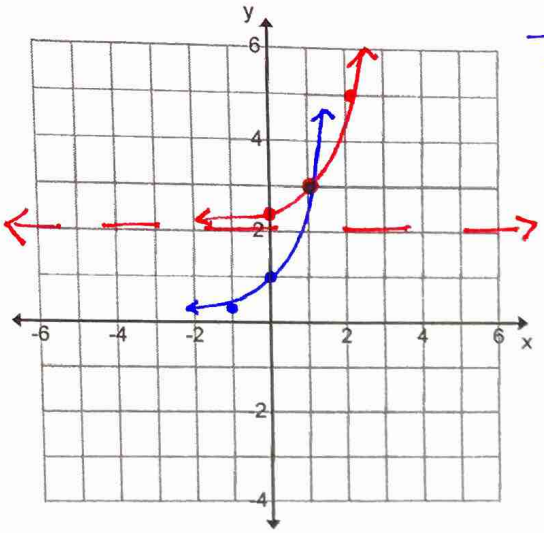
→ to find the eq. look @ asymptote

≡ PF

Graphing Examples:

1. $y = 3^{x-1} + 2$ R1 U2

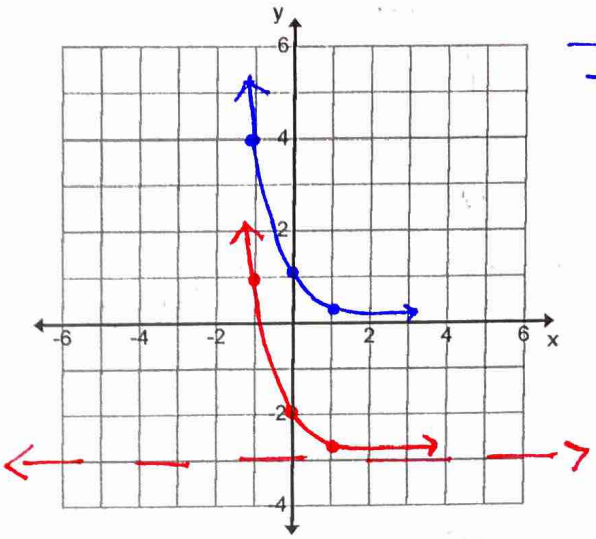
base: 3^x



X	Y
-1	1/3
0	1
1	3

2. $y = \left(\frac{1}{4}\right)^x - 3$ D3

base: $1/4^x$

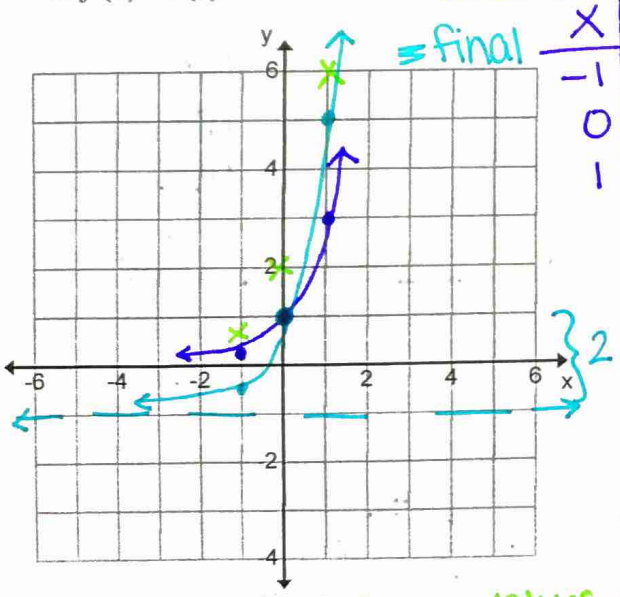


X	Y
-1	4
0	1
1	1/4

3. $f(x) = 2(3)^x - 1$ VD2 D1

base: 3^x

≡ final

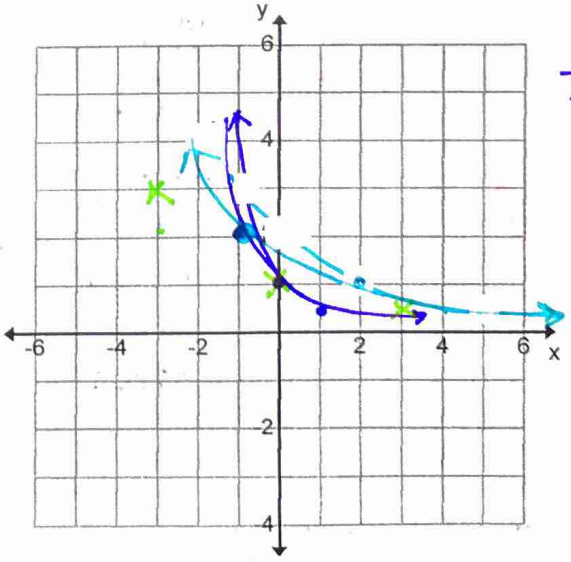


X	Y
-1	1/3
0	1
1	3

multiply y-values ·2

4. $y = \left(\frac{1}{2}\right)^{\frac{x-2}{3}}$ R2 HD by 3

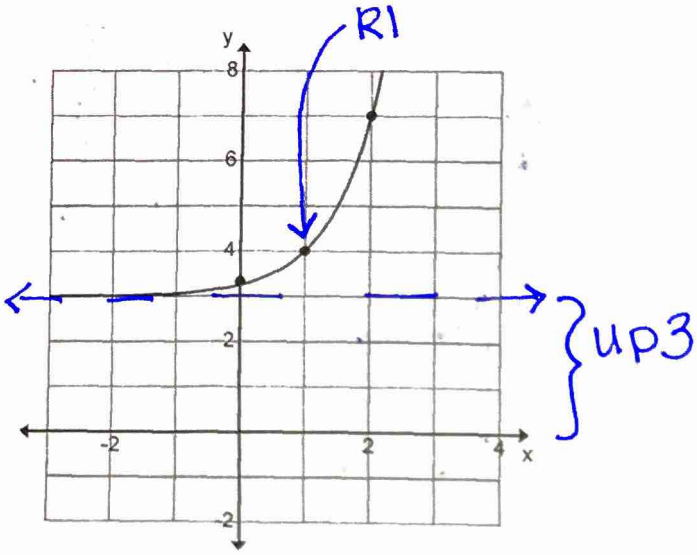
multiply x-values by 3



X	Y
-1	32
0	1
1	1/32

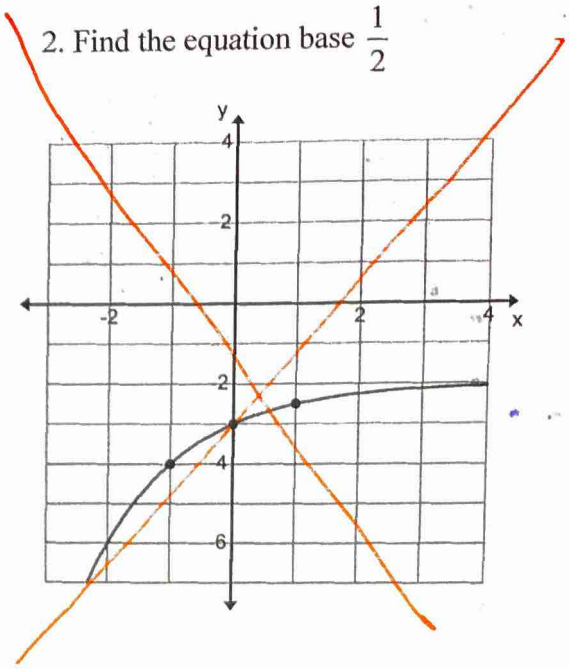
Finding the Equation Examples:

1. Find the equation base 4

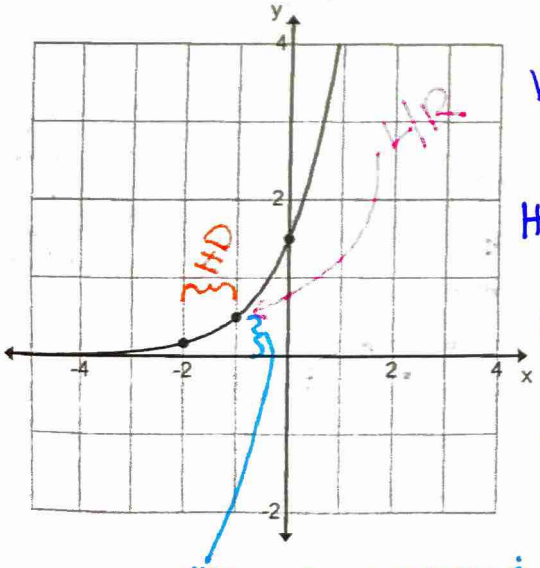


$y = 4^{x-1} + 3$

2. Find the equation base $\frac{1}{2}$



3. base 3



VD? $\frac{1}{2}$

HD? none

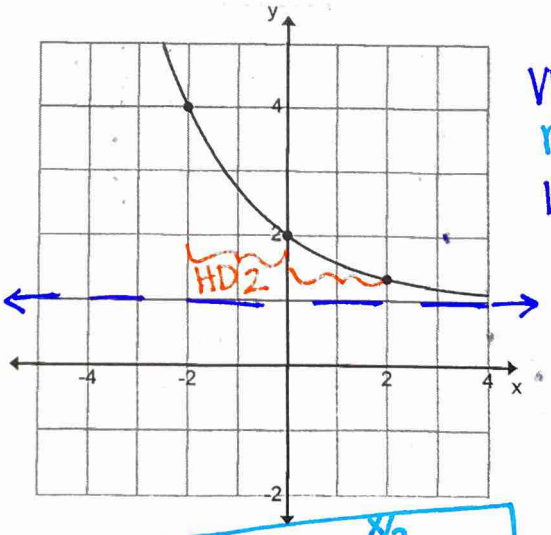
U/D? none

L/R? L1

dist. btwn asym & middle pt should be 1

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

4. base $\frac{1}{3}$



VD? none

HD? 2

U/D? U1

L/R? none

$\boxed{y = \frac{1}{3}^{x/2} + 1}$