

Name: Key

Date: _____

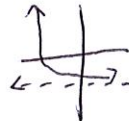
Transformations: $y = a \cdot b^{x-h} + k$

- stretch $a > 1$
shrink $0 < a < 1$
- if neg. reflect over x-axis
- (change) y's
- if neg, reflect over y-axis
- left or right $-h$
- up or down $+k$

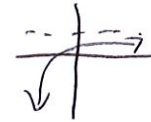
Domain: Always

Range: either:

\mathbb{R}



(asym., ∞)



($-\infty$, asym.)

Asymptote: $y = k$

horizontal, dashed line

X-Int: $(\#, 0)$

Y-Int: $(0, \#)$

Where it crosses the x-axis

Where it crosses the y-axis

Increasing or Decreasing

Read from left to right:

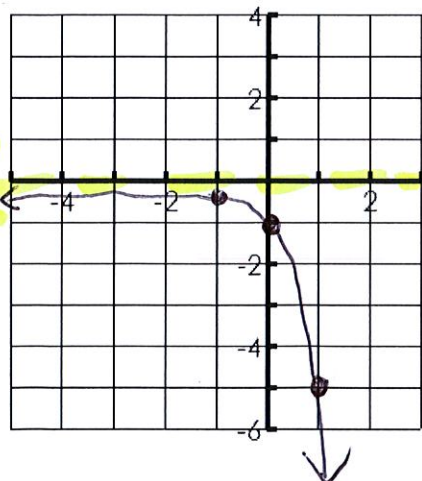
increasing - up from L to R
decreasing - down from L to R

End Behavior:

based on Domain $\left\{ \begin{array}{l} x \rightarrow -\infty, f(x) \rightarrow \text{---} \\ x \rightarrow +\infty, f(x) \rightarrow \text{---} \end{array} \right\}$ look left & right to get up & down

based on Range $\left\{ \begin{array}{l} \text{---} \\ \text{---} \end{array} \right\}$ up & down

1. $y = -5^x$



x	y
1	-5
0	-1
-1	-1/5

Transformations: Reflect over x-axis

State 3 points on Graph $(1, -5)$ $(0, -1)$ $(-1, -1/5)$

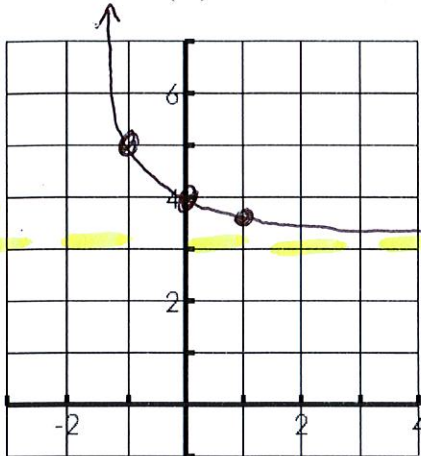
Domain \mathbb{R} Range $(-\infty, 0)$

Asymptote $y = 0$ Increasing or Decreasing

X-intercept NONE Y-intercept $(0, -1)$

End Behavior $x \rightarrow -\infty, f(x) \rightarrow 0$
 $x \rightarrow \infty, f(x) \rightarrow -\infty$

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



x	y
1	3.5
0	4
-1	5

x	y
1	3.5
0	4
-1	5

Transformations: up 3

State 3 points on Graph (1, 3.5) (0, 4) (-1, 5)

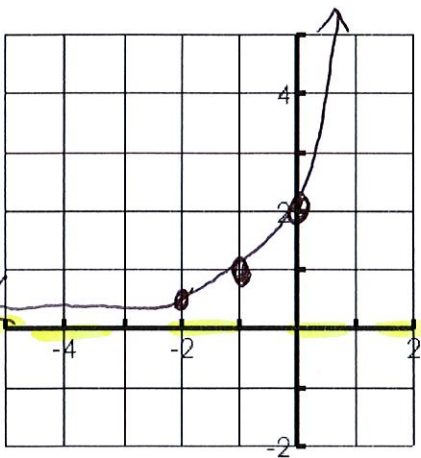
Domain \mathbb{R} Range $(3, \infty)$

Asymptote $y = 3$ Increasing or Decreasing

X-intercept NONE Y-intercept (0, 4)

End Behavior $x \rightarrow -\infty, f(x) \rightarrow \infty$
 $x \rightarrow \infty, f(x) \rightarrow 3$

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



x	y
1	2
0	1
-1	1/2

x	y
0	2
-1	1
-2	1/2

Transformations: left 1

State 3 points on Graph (0, 2) (-1, 1) (-2, 1/2)

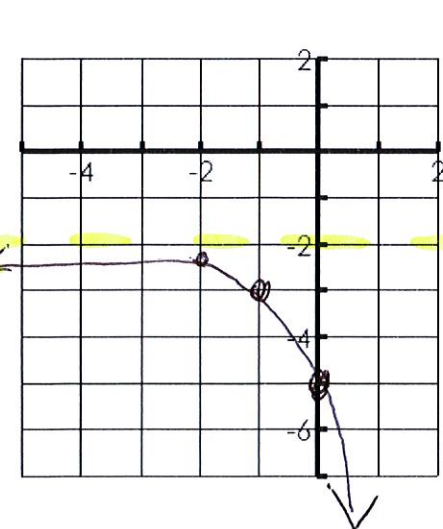
Domain \mathbb{R} Range $(0, \infty)$

Asymptote $y = 0$ Increasing or Decreasing

X-intercept NONE Y-intercept (0, 2)

End Behavior $x \rightarrow -\infty, f(x) \rightarrow 0$
 $x \rightarrow \infty, f(x) \rightarrow \infty$

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



x	y
1	-3
0	-1
-1	-1/3

x	y
0	-5
-1	-3
-2	-2 1/3

Transformations: reflect over x-axis, left 1, down 2

State 3 points on Graph (0, -5) (-1, -3) (-2, -2 1/3)

Domain \mathbb{R} Range $(-\infty, -2)$

Asymptote $y = -2$ Increasing or Decreasing

X-intercept NONE Y-intercept (0, -5)

End Behavior $x \rightarrow -\infty, f(x) \rightarrow -2$
 $x \rightarrow \infty, f(x) \rightarrow -\infty$