

Graphing: Exponential Decay Functions

Graph and analyze the following exponential growth functions. Your graph should accurately show the y-intercept and the asymptote. Determine at least two additional points on the right side of the graph. USE A PENCIL!

1. $f(x) = \left(\frac{1}{2}\right)^x + 0$

x	f(x)
-3	8
-2	4
-1	2
0	1
1	X
2	X

y-intercept 1 asymptote $y=0$
 domain $(-\infty, \infty)$ range $(0, \infty)$
 end behavior: as $x \rightarrow +\infty$, $f(x) \rightarrow$ 0
 and \mathbb{R}
 as $x \rightarrow -\infty$, $f(x) \rightarrow$ ∞

2. $f(x) = -\left(\frac{1}{2}\right)^x + 0$

x	f(x)
-3	-8
-2	-4
-1	-2
0	-1
1	~
2	~

y-intercept -1 asymptote $y=0$
 domain $(-\infty, \infty)$ range $(-\infty, 0)$
 end behavior: as $x \rightarrow +\infty$, $f(x) \rightarrow$ 0 and
 \mathbb{R}
 as $x \rightarrow -\infty$, $f(x) \rightarrow$ $-\infty$

3. $f(x) = \left(\frac{1}{2}\right)^x + 4$ ← asymptote

x	f(x)
-3	12
-2	8
-1	6
0	5 ← y-int
1	X
2	X

y-intercept 5 asymptote $y=4$
 domain $(-\infty, \infty)$ range $(4, \infty)$
 end behavior: as $x \rightarrow +\infty$, $f(x) \rightarrow$ 4
 and \mathbb{R}
 as $x \rightarrow -\infty$, $f(x) \rightarrow$ ∞

4. $f(x) = \left(\frac{1}{2}\right)^{x-3} + 0$

x	f(x)
0	8
1	4
2	2
3	1
4	~
5	~

y-intercept 8 asymptote $y=0$
 domain $(-\infty, \infty)$ range $(0, \infty)$
 end behavior: as $x \rightarrow +\infty$, $f(x) \rightarrow$ 0 and
 \mathbb{R}
 as $x \rightarrow -\infty$, $f(x) \rightarrow$ ∞