

Name:

Date:

Topic:

Class:

Main Ideas/Questions

Notes/Examples

range for "floor graphs" $y > k$ or if a is +
range for "ceiling graph" $y < k$ or if a is -

EXPONENTIAL Functions

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

- Exponential functions are defined by an equation of the form

$$f(x) = a(b)^{x-h} + k$$

- If $b > 1$, the function is an exponential growth and is increasing.
- If $b < 1$, the function is an exponential decay and is decreasing.

ASYMPTOTE

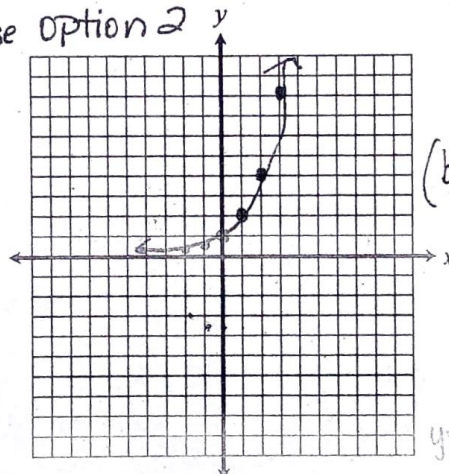
$y = k$ graph never crosses or touches this dashed line

f+hard: Loser
normal L, normal r
so decay

Directions: Classify as an exponential growth or decay, create a table of values and graph, then identify its key characteristics.

1. $y = 2^x$ table Choose option 2

x	y
-2	$\frac{1}{4}$
-1	$\frac{1}{2}$
0	1 <u>y-int</u>
1	2
2	4
3	8



(b) Growth / Decay $2 > 1$ so growth

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

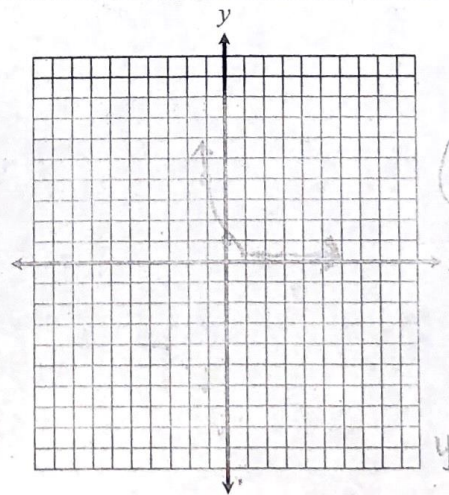
Range: $y > 0$

y-intercept: $y = 1$ or $(0, 1)$

$y = k$ Asymptote: $y = 0$

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

x	y
-1	4
0	1 <u>y-int</u>
1	$\frac{1}{4}$
2	$\frac{1}{16}$



(b) Growth / Decay

Domain: \mathbb{R}

Range: $y > 0$

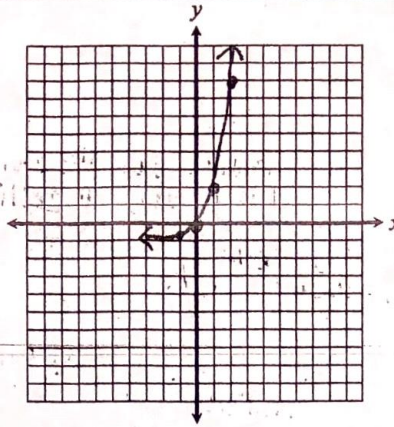
y-intercept: $y = 1$ or $(0, 1)$

$y = k$ Asymptote: $y = 0$

3. $y = 3^x - 1$

X	Y
0	0
1	2
2	8
3	26
-1	$\frac{2}{3}$

y int

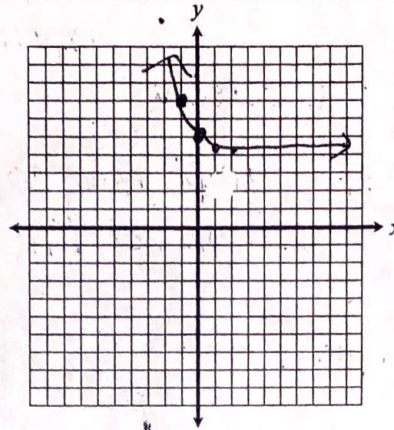


$b = 3$
 Growth / Decay
 Domain: \mathbb{R}
 Range: $y > -1$
 y-intercept: $y = 0$ or $(0, 0)$
 Asymptote: $y = -1$

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

X	Y
-2	13
-1	7
0	5
1	$\frac{10}{3} \approx 3.3$
2	$\frac{16}{9} \approx 1.8$

y int

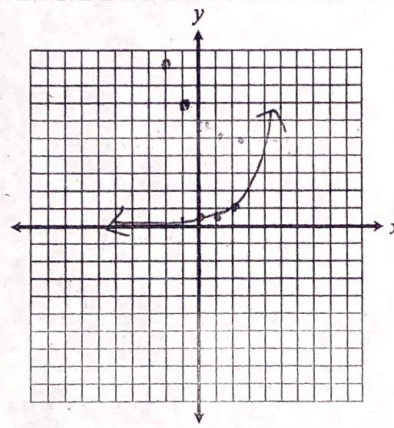


Growth / Decay
 Domain: \mathbb{R}
 Range: $y > 4$
 y-intercept: $y = 5$ or $(0, 5)$
 Asymptote: $y = 4$

5. $y = \frac{1}{4} \cdot 2^x$

X	Y
-2	$\frac{1}{16}$
-1	$\frac{1}{8}$
0	$\frac{1}{4}$
1	$\frac{1}{2}$
2	1

y int

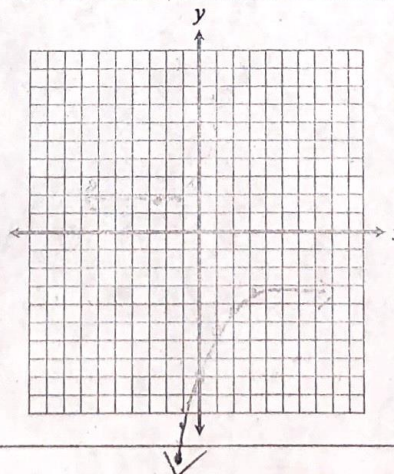


Growth / Decay
 Domain: $(-\infty, \infty)$
 Range: $y > 0$
 y-intercept: $y = \frac{1}{4}$ or $(0, \frac{1}{4})$
 Asymptote: $y = 0$

6. $y = 5\left(\frac{1}{2}\right)^x - 3$

X	Y
-2	-23
-1	-13
0	-8
1	-5.5
2	-4.25
3	-3.625

y int



reflection occurred so r shaped graph
 Growth / Decay
 Domain: $(-\infty, \infty)$
 Range: $y < -3$
 y-intercept: $y = -8$ or $(0, -8)$
 Asymptote: $y = -3$