

1) Which of the following models an exponential decay function?

- a)  $y = \frac{1}{2}t^2$
- b)  $y = 12\left(\frac{4}{3}\right)^t$
- c)  $y = 10 + 3t$
- d)  $y = 8\left(\frac{3}{7}\right)^t$

2) Which of the following models an exponential decay function?

- a)  $y = 8(0.67)^x$
- b)  $y = 5t^2$
- c)  $f(t) = 3(1.24)^t$
- d)  $f(x) = 2 + 5x$

3) Which of the following is NOT an exponential decay function?

- a)  $y = 5\left(\frac{2}{3}\right)^x$  ✓
- b)  $f(x) = \frac{1}{4}\left(\frac{1}{7}\right)^x$  ✓
- c)  $y = 6\left(\frac{3}{5}\right)^x$  ✓
- d)  $f(x) = 2\left(\frac{8}{3}\right)^x$

4) Classify the model  $y = 8(0.5)^x$  as exponential growth or decay. Then identify the growth or decay factor.

- a) Exponential growth, growth rate 50%
- b) Exponential decay, decay rate 50%
- c) Exponential growth, growth rate 8%
- d) Exponential decay, decay rate 40%

5) What is the y - intercept of  $y = \left(\frac{1}{2}\right)^{x-1}$ ?

$$x=0$$

$$y = \left(\frac{1}{2}\right)^{0-1} = \left(\frac{1}{2}\right)^{-1} = 2$$

$(0, -2)$

6) Evaluate the function at the given x value.

$$f(x) = \frac{1}{3}(6^x) \text{ at } x=2$$

$$f(2) = \frac{1}{3}(6)^2 = \frac{1}{3}(36)$$

$f(2) = 12$

Identify the following characteristics for each exponential growth function

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

Base:  $\frac{1}{2}$

Initial Value: 1

H.A:  $y=0$

y - int:  $(0, 1)$

End Beh:  $x \rightarrow \infty, y \rightarrow 0$   
 $x \rightarrow -\infty, y \rightarrow \infty$

8)  $f(x) = \left(\frac{1}{4}\right)^x + 6$

Base:  $\frac{1}{4}$

Initial Value: 1

H.A:  $y=6$

y - int:  $(0, 7)$

End Beh:  $x \rightarrow \infty, y \rightarrow 6$   
 $x \rightarrow -\infty, y \rightarrow \infty$

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

Base:  $\frac{1}{2}$

Initial Value: 1

H.A:  $y=-3$

y - int:  $(0, -2)$

End Beh:  $x \rightarrow \infty, y \rightarrow -3$   
 $x \rightarrow -\infty, y \rightarrow \infty$

10)  $f(x) = 3\left(\frac{2}{3}\right)^x$

Base:  $\frac{2}{3}$

Initial Value: 3

H.A.:  $y=0$

y-int:  $(0, 3)$

End Beh:  $x \rightarrow \infty, y \rightarrow 0$   
 $x \rightarrow -\infty, y \rightarrow \infty$

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

Base:  $\frac{1}{4}$

Initial Value: -2

H.A.:  $y = -1$

y-int:  $(0, -3)$

End Beh:  $x \rightarrow \infty, y \rightarrow -1$   
 $x \rightarrow -\infty, y \rightarrow \infty$

12)  $y = -5(0.5^x) + 2$

Base: 0.5

Initial Value: -5

H.A.:  $y = 2$

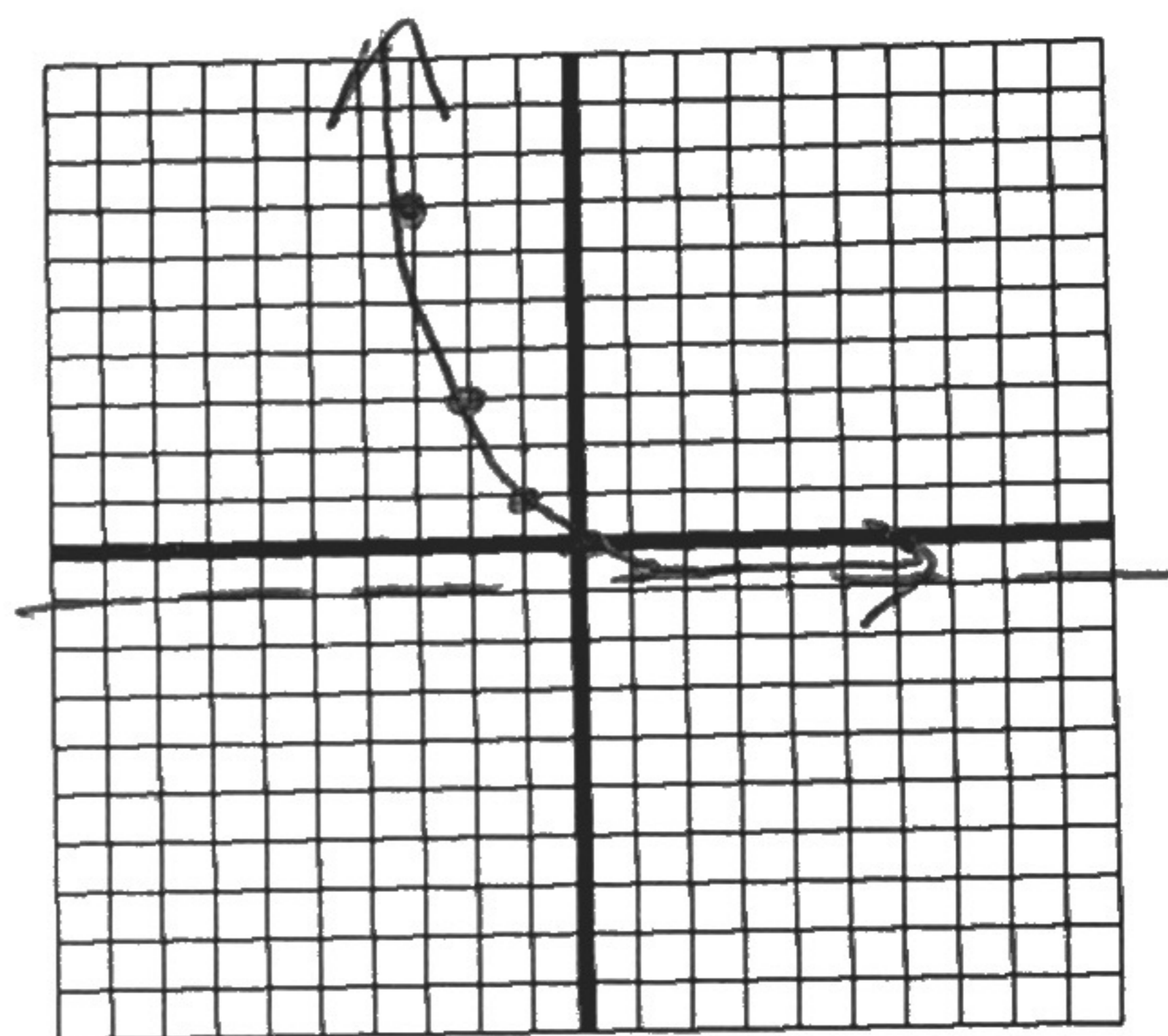
y-int:  $(0, -3)$

End Beh:  $x \rightarrow \infty, y \rightarrow 2$   
 $x \rightarrow -\infty, y \rightarrow \infty$

13) Graph the exponential function  $y = \left(\frac{1}{2}\right)^x - 1$

x	y
-3	7
-2	3
-1	1
0	0
1	-1/2
2	-3/4
3	-0.875

Growth or Decay? decay  
 Initial Value: 1 Base: 1/2  
 HA:  $y = -1$   $y > -1$   
 Domain:  $\mathbb{R}$  Range:  $(-1, \infty)$   
 Max: none Min: none  
 Y-Intercept:  $(0, 0)$   
 Increasing: none Decreasing:  $\mathbb{R}$   
 End Behavior: As x increases, y approaches -1

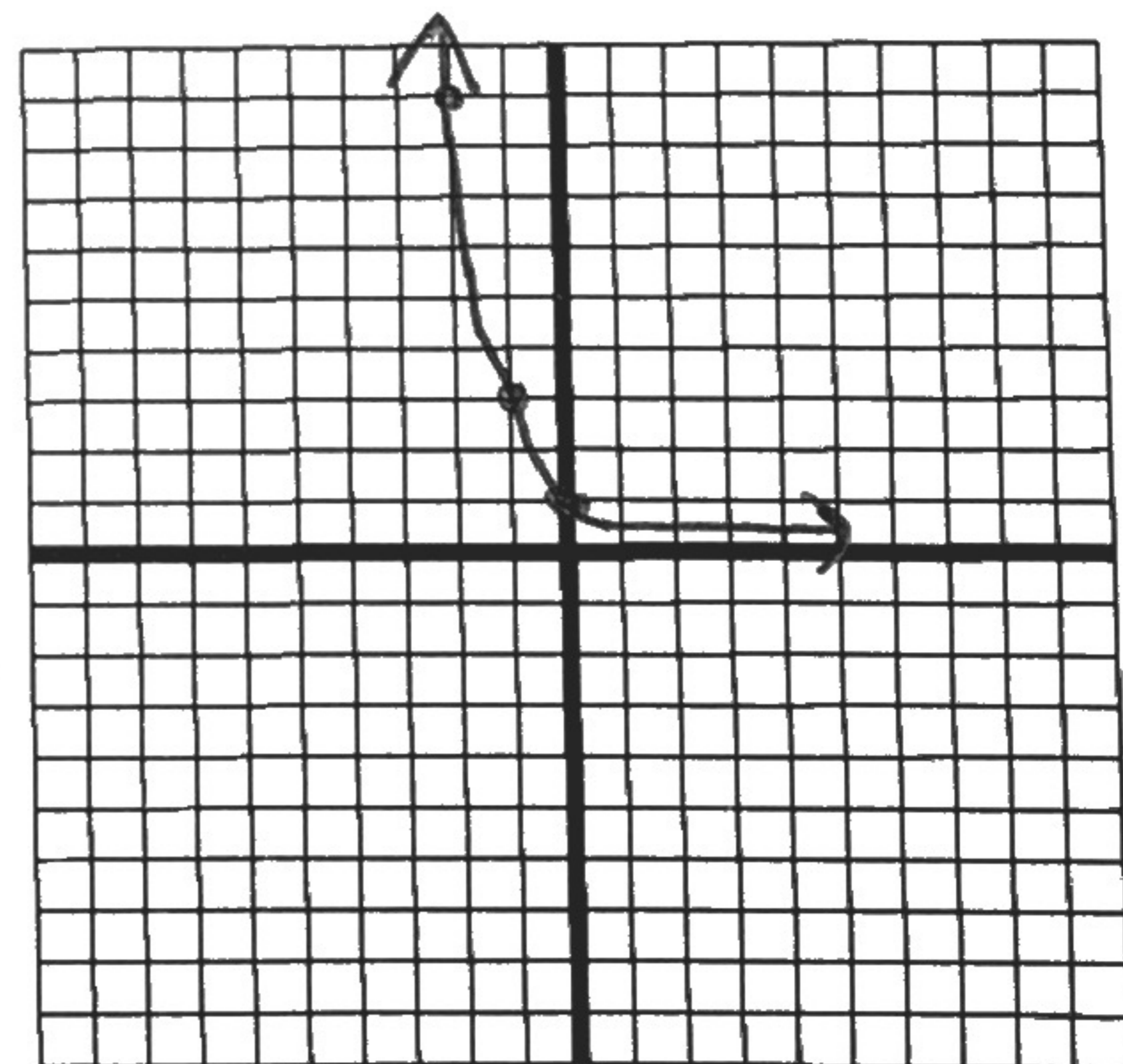


As x decreases, y approaches  $\infty$

14) Graph the exponential function  $y = \left(\frac{1}{3}\right)^x$

x	y
-3	27
-2	9
-1	3
0	1
1	1/3
2	1/9
3	1/27

Growth or Decay? decay  
 Initial Value: 1 Base: 1/3  $y > 0$   
 HA:  $y = 0$  Domain:  $\mathbb{R}$  Range:  $(0, \infty)$   
 Max: none Min: none  
 Y-Intercept:  $(0, 1)$   
 Increasing: none Decreasing:  $\mathbb{R}$   
 End Behavior: As x increases, y approaches 0



As x decreases, y approaches  $\infty$