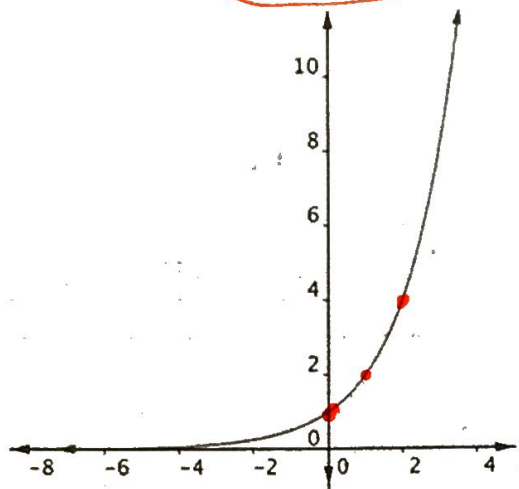


Unit 2 Test Review: Linear vs. Exponential Functions

Part I: Determine if the function is linear or exponential and then write the recursive AND explicit equations for each of the following.

1. Circle: Linear Exponential Neither



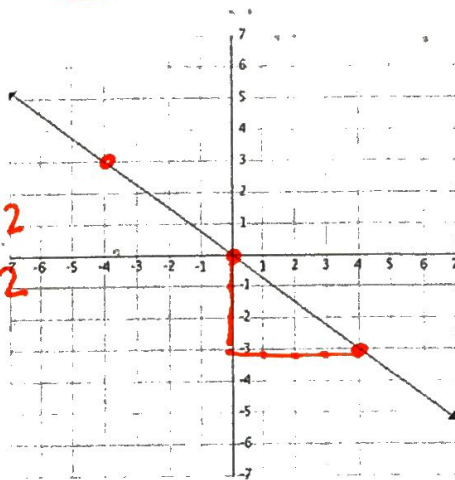
x	y
0	1
1	2
2	4

Handwritten notes: 2×2 and 4×2 with arrows pointing to the y-values.

Recursive: $F(n) = F(n-1) \times 2$ $F(0) = 1$

Explicit: $y = 1(2)^x$

2. Circle: Linear Exponential Neither



$(-4, 3)$

$-\frac{3}{4}$

Recursive: $F(n) = F(n-1) - \frac{3}{4}$ $F(0) = 0$

Explicit: $y = -\frac{3}{4}(x - -4) + 3$
 $y = -\frac{3}{4}(x + 4) + 3$ $y = -\frac{3}{4}x$

3. Circle: Linear Exponential Neither

x	f(x)
3	5
4	30
5	180

Handwritten notes: $x \times 6$ and $x \times 6$ with arrows pointing to the y-values.

Recursive: $F(n) = F(n-1) \times 6$ $F(3) = 5$

Explicit: $y = 5(6)^{x-3}$

4. Circle: Linear Exponential Neither

x	f(x)
3	-7
4	-2
5	3

Handwritten notes: $+5$ and $+5$ with arrows pointing to the y-values.

Recursive: $F(n) = F(n-1) + 5$ $F(3) = -7$

Explicit: $y = 5(x-3) - 7$
 $y = 5x - 15 - 7$
 $y = 5x - 22$

5. Circle: Linear Exponential Neither

Mrs. Clay currently has 5 giraffes living in her backyard (Dreams really do come true ☺), and they are doubling each year.

Recursive: $F(n) = F(n-1) \times 2$ $F(0) = 5$ Explicit: $y = 5(2)^x$

Mrs. Clay's backyard can only hold 80 giraffes comfortably, so after how many years will Mrs. Clay need to move to a house with a bigger yard in order to accommodate all of her giraffe friends?

She needs to move after 4 years

6. Circle: Linear Exponential Neither

Mrs. Clay has decided to finally stop saying she's going to save money and actually start saving money. She opens a savings account with \$1,000.00 and plans to put \$200.00 a month in the account. When will she have enough money saved up to go on her trip to New York if her trip is going to cost her \$3,000.00 total?

Recursive: $F(n) = F(n-1) + 200$
 $F(0) = 1,000$

Explicit: $y = 200x + 1000$

She can go to New York after 10 months.

Part II: Answer the following questions completely. Use multiple representations to assist you (i.e. tables, graphs, equations, etc.)

7. Find the equation for the line that goes through the point $(-2, 22)$ and has a slope of -5 . (Hint: Think "Should I use slope-intercept or point-slope form?")

$y = m(x - x_1) + y_1$
 $y = -5(x + 2) + 22$
 $y = -5x - 10 + 22$
 $y = -5x + 12$
 slope-intercept

8. Find the equation of the line that passes through the points $(2, -7)$ and $(6, 17)$. (Hint: Think "Should I use slope-intercept or point-slope form?")

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{17 - (-7)}{6 - 2} = \frac{24}{4} = 6$
 $y = 6(x - 6) + 17$

9. Given the functions $f(x) = 8x$ and $g(x) = 3^x$, for which integer is $f(x) < g(x)$?

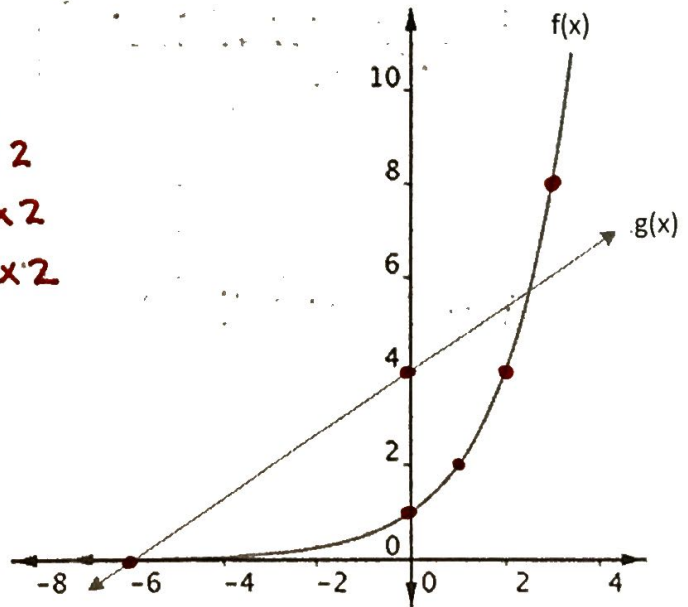
- a. 1 b. 2 c. 3 d. 5 Both work! ;)
- $8(1) > 3(1)$ $8(2) > 3(2)$ $8(3) < 3(3)$ $8(5) < 3(5)$
 $8 > 3$ $16 > 9$ $24 < 27$ $40 < 243$

10. In 2010, the Dixie Chicks began losing their popularity; therefore, causing them to decrease their ticket prices each year until 2016 when they had a farewell reunion tour. A concert ticket cost \$63 in 2013 but only \$51 in 2016. How much did a ticket cost in 2010? (Let $x=0$ represent the year 2010).

11. Write the equations for both graphs on the grid to the right.

$f(x) = \frac{2}{3}x + 4$
 $g(x) = 1(2)^x$

x	g(x)
0	1 $\times 2$
1	2 $\times 2$
2	4 $\times 2$
3	8 $\times 2$



12. The function $f(x) = 0.49x$ models the cost to purchase x pounds of apples from the grocery store. What is the most appropriate domain for the function?

Positive Rational Numbers

13. The function $f(x) = 3x + 10$ models the total cost Katie charges to babysit x amount of children. What is the most appropriate domain for the function?

Positive Whole Numbers (can't have 0.5 children!)