NAME: _____ PERIOD: _____ DATE: _____

Homework Problem Set

The formulas for Geometric sequences written in red are starting from term 1. Those written in black are from term 0

Fill in the chart by stating the next terms in each sequence, describing the sequence as arithmetic or geometric, determining the common difference or ratio, and finally writing the formula.

	Sequence	Arithmetic or Geometric?	Common Difference or Common Ratio	Formula
1.	2, 5, 8, 11, 14	Arithmetic	$d = 3$	$f(x) = 3x - 1$
2.	2, 6, 18, 54, 162	Geometric	$r = 3$	$f(x) = 2(3)^{x-1}$ OR $f(x) \frac{2}{3}(3)^x$
3.	−2, −4, −8, −16, −32	Geometric	$r = 2$	$f(x) = -2 \cdot (2)^{x-1}$ OR $f(x) = -1(2)^x$
4.	−2, −4, −6, −8, −10	Arithmetic	$d = -2$	$f(x) = -2x$
5.	1, 2, 3, 4, 5	Arithmetic	$d = 1$	$f(x) = x$
6.	1, 3, 9, 27, 81	Geometric	$r = 3$	$f(x) = 1(3)^{x-1}$ OR $f(x) = \frac{1}{3}(3)^x$
7.	−1, −4, −7, −10, −13	Arithmetic	$d = -3$	$f(x) = -3x + 2$
8.	−1, −4, −16, −64, −256	Geometric	$r = 4$	$f(x) = -1(4)^{x-1}$ or $f(x) = -\frac{1}{4}(4)^x$

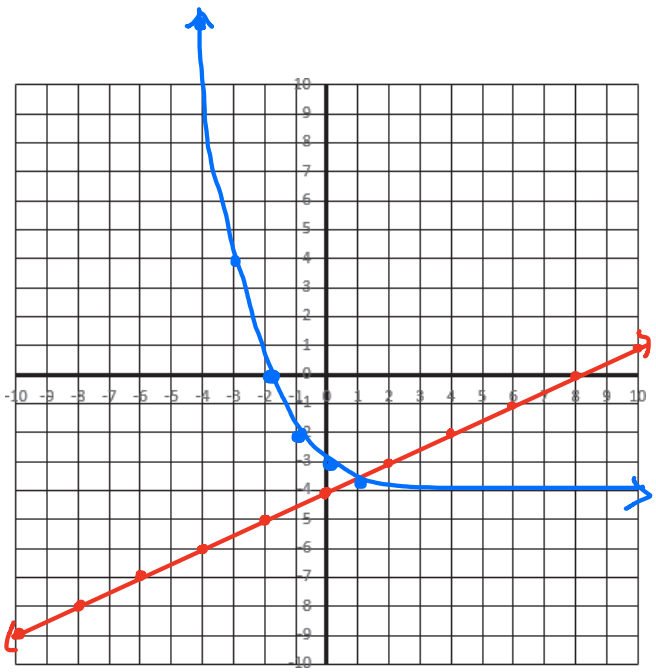
Graph each set of functions on the same grid. Then state which is linear and which is exponential and whether they are showing growth or decay. Create a table of values if necessary to graph the equations.

9. A. $f(x) = \frac{1}{2}x - 4$ B. $f(x) = \left(\frac{1}{2}\right)^x - 4$

Linear Growth
$m = \frac{1}{2}$
$b = -4$

Exponential Decay

x	y
-4	12
-3	4
-2	0
-1	-2
0	-3
1	-3.5



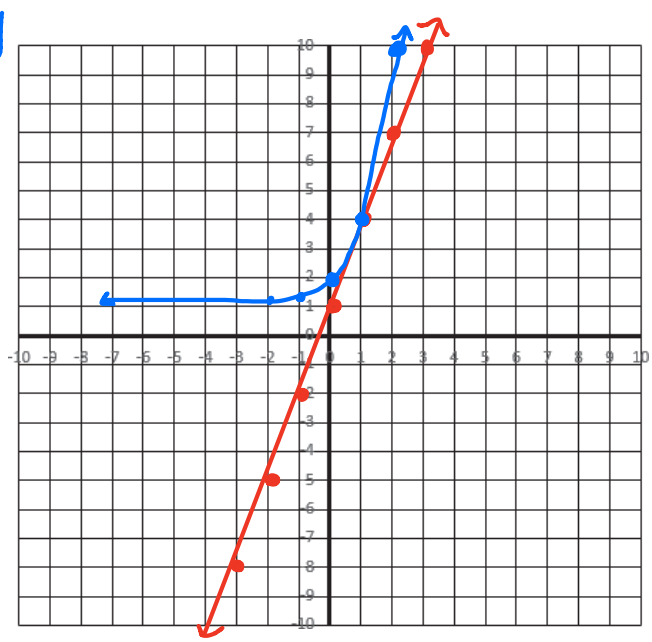
C. Where do the two graphs meet? When is the exponential function greater than the linear function?

They meet at (1, -3.5)
Exponential is greater than the linear function when $x < 1$

10. A. $f(x) = 3x + 1$ B. $f(x) = 3^x + 1$

Linear Growth

Exponential Growth

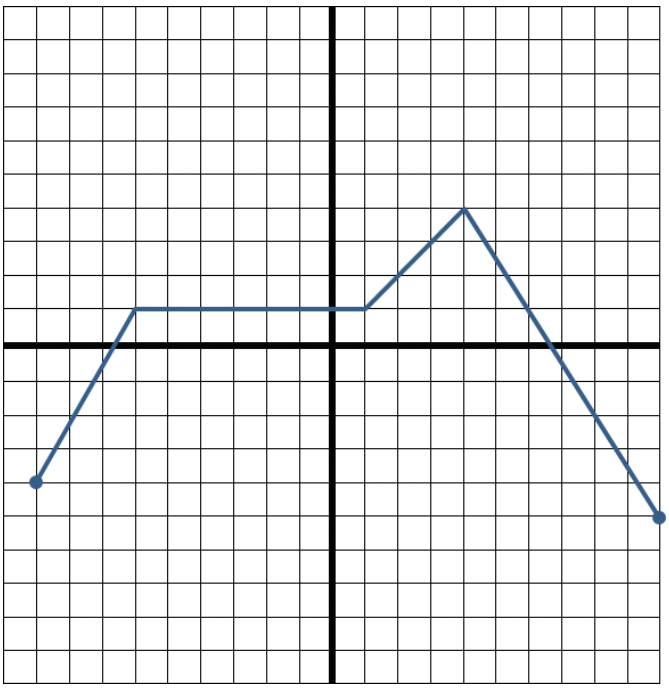


C. Where do the two graphs meet? When is the exponential function greater than the linear function?

Functions meet at (1, 4)
Exponential is greater than linear for most x-values except around $x = 0.826$ to $x = 1$
↑ use graphing calc to determine

Spiral REVIEW—Evaluating Functions with a Graph

Use the graph of $f(x)$ to determine each of the following values.

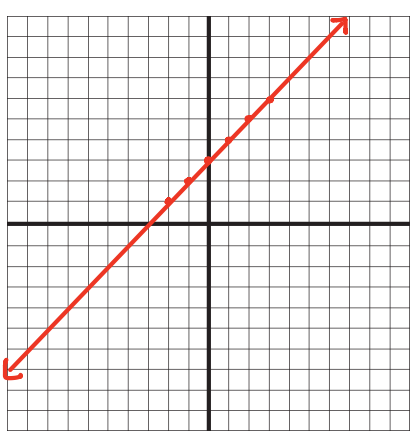


11. $f(-9) = -4$
12. $f(-6) = 1$
13. $f(-3) = 1$
14. $f(-1) = 1$
15. $f(0) = 1$
16. $f(2) = 2$
17. $f(4) = 4$
18. $f(6) = 1$
19. $f(8) = -2$
20. $f(10) = -5$

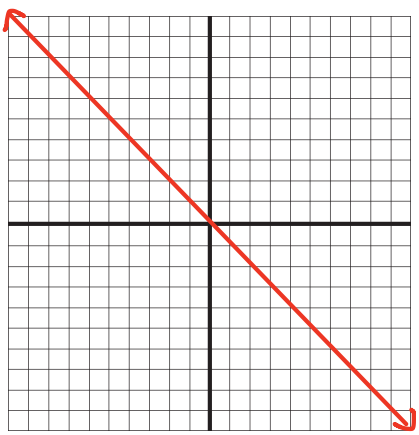
Spiral REVIEW—Graphing Linear Functions

Graph each of the following.

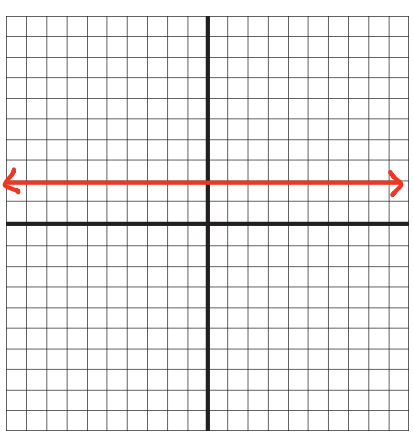
21. $f(x) = x + 3$



22. $f(x) = -x$



23. $f(x) = 2$ → $y = 2$



Spiral REVIEW—Evaluating and Graphing a Piecewise Function

Determine the following values for the function, $f(x) = \begin{cases} x + 3, & \text{if } x > 1 \\ -x, & \text{if } x \leq 1 \end{cases}$.

24. $f(1)$

$f(1) = -x$

$f(1) = -1$

25. $f(2)$

$f(2) = x + 3$

$f(2) = 5$

26. $f(-2)$

$f(-2) = 2$

27. $f(0)$

$f(0) = 0$

28. $f(-1)$

$f(-1) = 1$

29. $f(3)$

$f(3) = 6$

30. Graph the function, $f(x) = \begin{cases} x + 3, & \text{if } x > 1 \\ -x, & \text{if } x \leq 1 \end{cases}$. You may want to use the values in Problems 24–29 and the graphs in Problems 21 and 22 to help you draw the piecewise graph.