

Unit 9 Review

$$y = a \cdot b^x$$

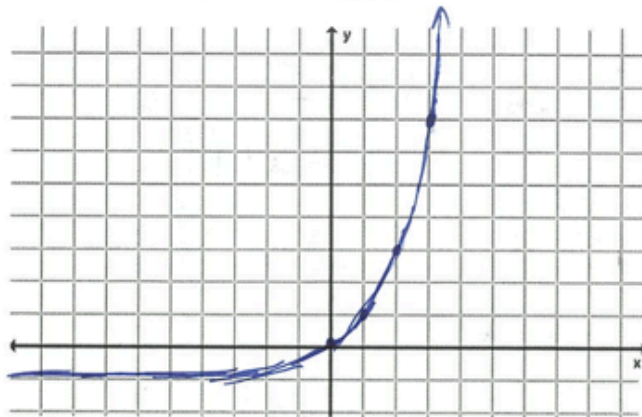
$$y = 4^x$$

$$y\text{-int: } 1$$

$$y = 2 \cdot 4^x$$

1. The table shows the function $y = 2^x - 1$. Graph the function.

x	y
0	0
1	1
2	3
3	7



2. The table shows the percentage of eighth graders at a certain school with a cell phone in each year. Determine if the table shows exponential behavior or not.

Year	Percent of 8th graders with cell phone
2005	2
2008	6
2011	18
2014	54

↑

3. Select all functions that are exponential

- a. $y = 3x - 2$
 b. $y = 3^x$
 c. $y = \left(\frac{1}{2}\right)^{3x}$
 d. $y = 3x^2$

4. In an exponential growth function, as x increases, y ↑ and, as x ↓, y approaches 0.

5. Describe the translation in $g(x) = 2^x + 5$ as it relates to the graph of the parent function $f(x) = 2^x$.

Translate up 5

6. A company can estimate the number of items x they will have sold after x months with the parent function $b(x)=1.25^x$. Suppose the company produces 4 types of items, which can be modeled with the function $b(x)=4(1.25)^x$. Describe the dilation in the graph as it relates to the parent function.

Vertical Stretch

7. Write the function that represents the reflection of $f(x) = 3^x$ across the y-axis.

$$g(x) = 3^{-x}$$

8. Create an exponential function for the following graph.

$$y = a \cdot b^x$$

$$3 = a \cdot b^1$$

$$48 = a \cdot b^3$$

$$\frac{3}{b} = \frac{a \cdot b}{b}$$

$$y = \frac{3}{4} (4)^x$$

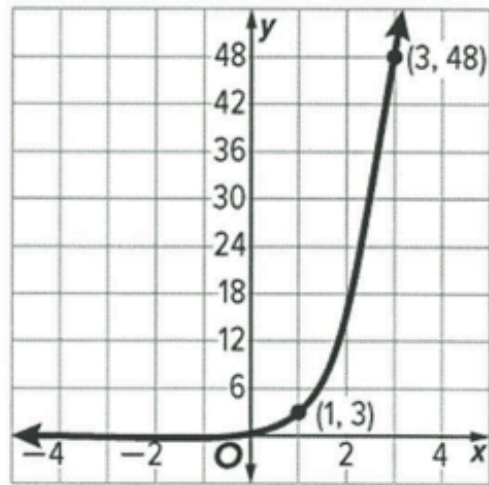
$$48 = \frac{3}{b} \cdot b^3$$

$$48 = 3b^2$$

$$\frac{48}{3} = \frac{3b^2}{3}$$

$$16 = b^2$$

$$b = 4$$



9. *True or false:* In exponential decay, the amount decreases by the same percent in each equal interval over a period of time.

10. Whitney invests \$3000 in an account earning 4.5% interest that is compounded annually. How much money will be in Whitney's account after 10 years?

$$A = P \left(1 + \frac{r}{n}\right)^{nt}$$

$$3000 \left(1 + \frac{0.045}{1}\right)^{10}$$

$$y = 4658.91$$

11. True or false: A geometric sequence must have a common difference.

F

12. Determine the next 2 terms in the geometric sequence 3, 6, 12, 24, .. 48 96

13. Attendance for local baseball games has been increasing by an average of 10% the last few years. In 2016, the average attendance was 100 people. Predict the average number of people attending local baseball games in 2020 if this trend continues. Round to the nearest whole number.

$$y = A(1+r)^t$$

146

$$y = 100(1+.1)^4$$
$$100(1.1)^4$$
$$y = 146.41$$

14. What equation can be written for the n th term of this geometric sequence?

n	1	2	3	4
A_n	100	-50	25	-12.5

$$a_n = a_1(r)^{n-1}$$

$$a_n = 100(-0.5)^{n-1}$$

15. The table shows the number of pages Aaron read in his book each day.

Day	1	2	3	4
Pages Read	20	35	50	65

$$d = 15$$

Write a recursive formula for the table.

$$a_1 = 20; a_n = a_{n-1} + 15; n \geq 2$$

16. List the first five terms of the sequence for $a_1 = -2$ and $a_n = 2a_{n-1} + 5$, if $n \geq 2$.

$$a_1 = -2$$

$$a_2 = 2(-2) + 5$$

$$a_2 = 1$$

$$a_3 = 7$$

$$a_4 = 19$$

$$a_5 = 43$$

17. Complete the table for the geometric sequence.

n	$a_1 = 3$ and $a_n = 4a_{n-1}$, if $n \geq 2$	a_n
1	$a_1 = 3$	3
2	$a_2 = 4(3)$	12
3	$a_3 = 4(a_{2-1})$	48
4	$A_4 = 4(a_{4-1})$	192

18. Find the domain, range, key features for the following functions. (Remember that the key features are y-intercept, common ratio, and end behavior).

a. $y = 25(1.07)^x$

$$y\text{-int: } 25$$

$$r: 1.07$$

$$\text{E.B.: } x \uparrow y \uparrow \quad x \downarrow y \rightarrow 0$$

$$D: \mathbb{R}$$

$$R: y > 0$$

b. $y = 5^x$

$$y\text{-int: } 1$$

$$r: 5$$

$$\text{E.B.: } x \uparrow y \uparrow \quad x \downarrow y \rightarrow 0$$

$$D: \mathbb{R}$$

$$R: y > 0$$

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

$$y\text{-int: } -2$$

$$r: \frac{1}{5}$$

$$\text{E.B.: } x \uparrow y \rightarrow 0 \quad x \downarrow y \downarrow$$

$$D: \mathbb{R}$$

$$R: y < 0$$