

Algebra 2 CC
Exponential Models Review

Name _____

1.) Graph the function: $f(x) = 2^{x+3} - 5$

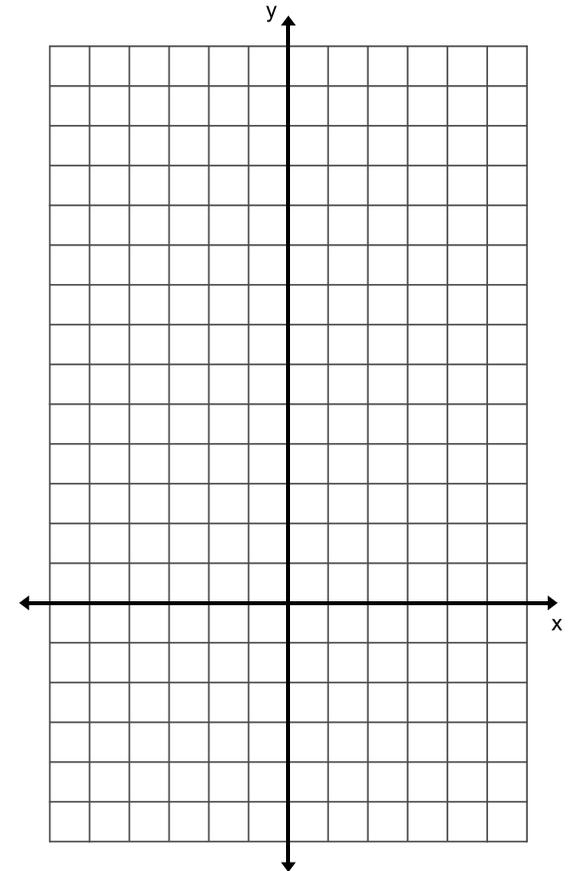
b. State the domain.

c. State the range.

d. Graph the asymptote.

e. Write the equation of the asymptote in the box below.

f. As $x \rightarrow \infty$ the graph is always _____.



increasing or decreasing

2.) Graph the function: $f(x) = \left(\frac{1}{3}\right)^{x+1} + 2$

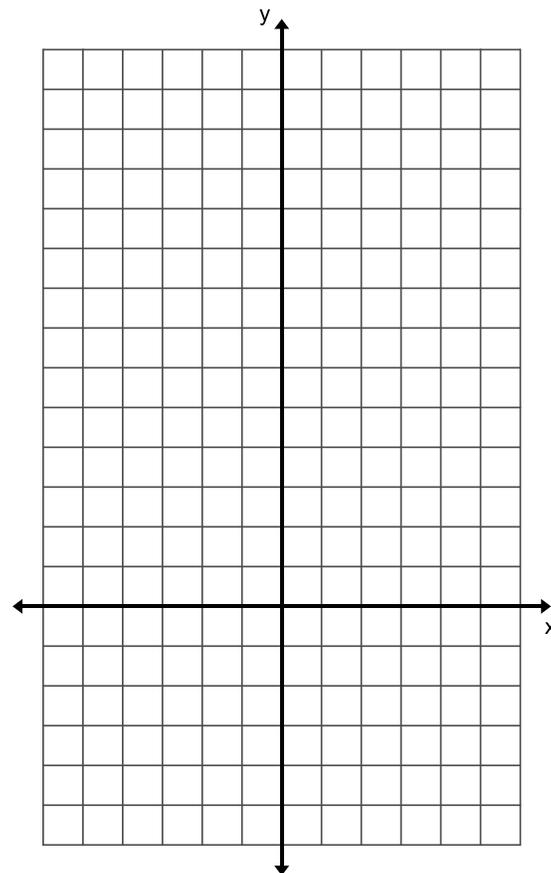
b. State the domain.

c. State the range.

d. Graph the asymptote.

e. Write the equation of the asymptote in the box below.

f. As $x \rightarrow \infty$ the graph is always _____ .



increasing or decreasing

State whether $f(x)$ is an exponential **growth** or **decay** function.

3.) $f(x) = (3)^{-x}$

4.) $f(x) = (0.45)^{2x}$

5.) $f(x) = \left(\frac{4}{3}\right)^x$

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

7.) $f(x) = 6(1.2)^{-2x}$

8.) $f(x) = 3(0.25)^{-1.5x}$

9.) The number of carbon atoms in a fossil is given by the function, $y = 300(0.75)^x$, where x represents the number of years since being discovered.

Is this function an exponential growth or decay? What is the percent rate of change?

(A) Exponential growth; 75%

(B) Exponential decay; 75%

(C) Exponential growth; 25%

(D) Exponential decay; 25%

10.) As an automobile get older, the resale value **decreases**. This is called depreciation.

a. Write an equation to represent 18% depreciation per year, for a brand new \$39,389 automobile.

b. Predict how much the automobile will be worth in 5 years, *round to the nearest dollar*.

11.) Kathy deposits \$25 into an investment account with an annual rate of 5% compounded **annually**.

How much money, *to the nearest cent*, will be in her account at the end of 15 years?

12.) A house purchased 5 years ago for \$140,000 was just sold for \$160,000. Assuming exponential growth, approximate the annual growth rate, *to the nearest percent*.

13.) Mr. Wing bought a ring in 2014 for \$2800. In 2017, the ring was assessed at \$3200.

Assuming exponential growth, approximate the annual growth rate, *to the nearest percent*.

14.) A study of the annual population of the red-winged blackbird in Ft. Mill, S.C., shows the population, $B(t)$, can be represented by the function $B(t) = 750(1.06)^t$, where t represents the number of *years* since the study began. In terms of the *monthly* rate of growth, the population of red-wings blackbirds can be best approximated by the function

(A) $B(t) = 750(1.005)^t$

(B) $B(t) = 750(1.005)^{12t}$

(C) $B(t) = 750(1.06)^{12t}$

(D) $B(t) = 750(1.06)^{\frac{t}{12}}$

15.) Milton has his money invested in a stock portfolio. The value, $v(x)$, of his portfolio can be modeled with the function $v(x) = 30,000(0.78)^x$, where x is the number of years since he made his investment.

Which statement describes the rate of change of the value of his portfolio?

(A) It decreases 78% per year

(B) It decreases 22% per year

(C) It increases 78% per year

(D) It increases 22% per year

16.) Mary invests \$800 in a savings account that offers 7.5% interest **compounded quarterly**.

If she leaves her money in her account for 12 years, how much money will she earn? [Round to the nearest cent]

17.) Brian invests \$2600 in an account that pays 1.5% annual interest that is *compounded continuously*.

How much money will Brian earn over a 5-year period? [Round to the nearest cent.]

18.) Brooke invests \$3300 in an account that pays 3% annual interest that is *compounded continuously*.

How much money will Brooke earn over a 3-year period? [Round to the nearest cent.]

19.) Matt invests \$1500 in a savings account that offers 2.45% interest **compounded monthly**.

If he leaves his money in his account for 8 years, how much money will he earn? [Round to the nearest cent]

20.) An equation that models the number of bacteria cell growth is represented by $f(x) = 700(1.3)^x$, where x is the time in **days**.

a. What was the initial number of bacteria cells, before the growth began?

b. By what percent, did the bacteria increase each **day**?

c. In terms of **hourly** rate of growth, write an equation that represents the growth of bacteria cells.

d. By what percent, did the bacteria increase each **hour**? [Round to the nearest tenth of a percent]

21.) The population of a town in upstate New York was 20,000 in the year 2015. The population follows the following formula: $P = 20,000(0.96)^{-4t}$, where P is the population of the town t years after 2015.

a. Is the formula a growth model or a decay model?

b. What is the percent of growth or decay?

c. What is the projected population in the year 2020? [Round to the nearest person]

22.) If the function of $g(x) = ab^x$ represents exponential growth, which statement about $g(x)$ is *false*?

(A) $a > 0$ and $b > 1$

(C) The asymptote is $y = 0$

(B) The y -intercept is $(0, a)$

(D) The x -intercept is $(b, 0)$

23.) Which statement is true about the graph of $f(x) = \left(\frac{1}{8}\right)^x$?

(A) The graph is always increasing.

(B) The graph is always decreasing.

(C) The graph passes through $(1, 0)$.

(D) The graph has an asymptote, $x = 0$.