

## HW40: Exponential Growth

Date \_\_\_\_\_ Period \_\_\_\_\_

Use the scenario to answer the questions. Show a table on a separate paper.

**4 scholars infected with Solanum were found to be at Heritage Academy, Laveen.**

- 1) Write a function,  $S$ , that represents the amount of scholars infected after  $d$  days.
- 2) Mrs. Rowland teaches 115 scholars. How long before all of Mrs. Rowland's scholars are infected?
- 3) There are 500 scholars at HAL. How long before they are all infected?
- 4) How many scholars are infected by the 13th day?

**Jared heard some exciting news and shared it with three of his friends. Each of those friends repeated it to three more people. Every one who heard the news told three more people.**

- 5) Assume the news continues to spread in this matter. Write a function  $N$  that describes how many people learn the news on the  $d$ th day.
- 6) How long does it take for 10,000 people to hear the news?
- 7) How many people learn the news on the 12th day?
- 8) Function models are not always fully accurate. What are some real-life reasons why the news might not follow the pattern described by the function?

**In the second half of the 20th century, the city of Phoenix, Arizona exploded in size. Between 1960 and 2000, the population of Phoenix increased by 2.76% each year. In the year 2000, the population of Phoenix was determined to be 1.32 million people.**

**(c) 2013 Carlson, Oehrtman, and Moore, Precalculus: Pathways to Calculus, Fourth edition**

- 9) Write an exponential function that describes the population of Phoenix (in millions of people)  $t$  years after 2000.  
(Hint: write the percent as a decimal and add 1 to create the growth factor)
- 10) What input to the function will give you the year 2005? The year 2019? The year 1970? The year 1982?
- 11) What was the population of Phoenix in 2002? Round to the hundredths place.
- 12) In what year did the population reach 1,000,000 people?

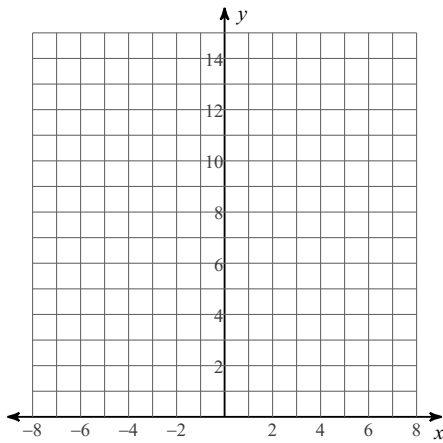
Create a table (on a separate page) and graph the exponential growth function. Then, identify the domain, the range, and the horizontal asymptote.

13)  $f(x) = 3^x$

Domain:

Range:

Horizontal Asymptote:

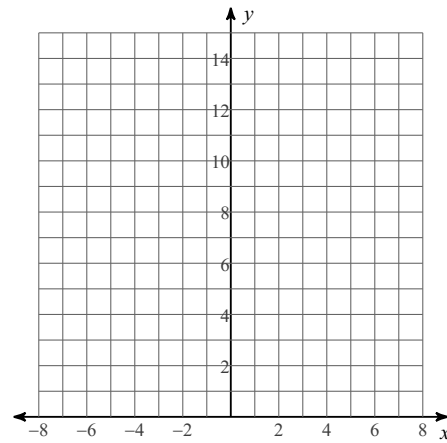


14)  $f(x) = 5^x$

Domain:

Range:

Horizontal Asymptote:

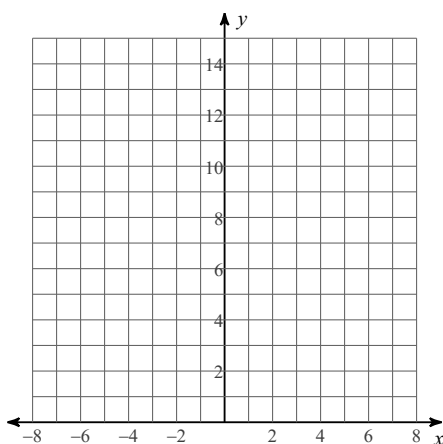


15)  $f(x) = 2 \cdot 2^x$

Domain:

Range:

Horizontal Asymptote:

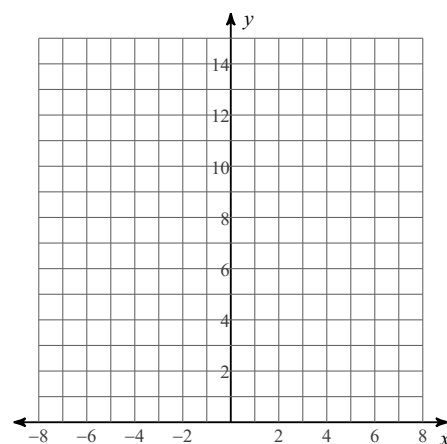


16)  $f(x) = 2 \cdot 6^x$

Domain:

Range:

Horizontal Asymptote:

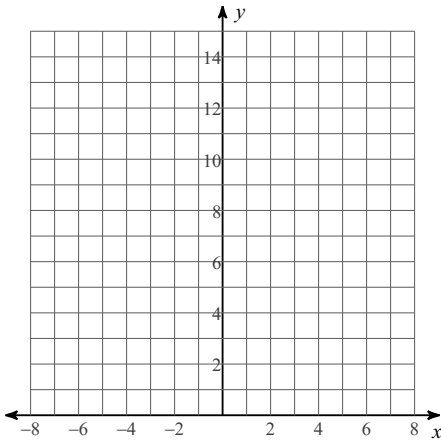


$$17) f(x) = \frac{1}{2} \cdot 4^x$$

Domain:

Range:

Horizontal Asymptote:

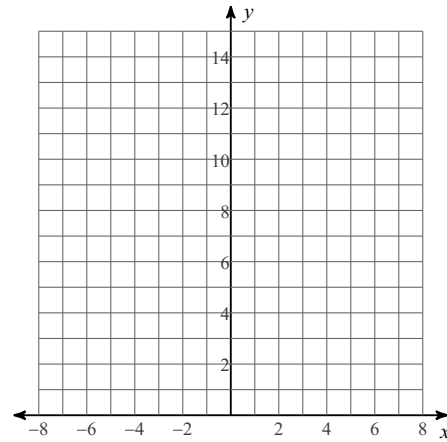


$$18) f(x) = \frac{1}{4} \cdot 6^x$$

Domain:

Range:

Horizontal Asymptote:

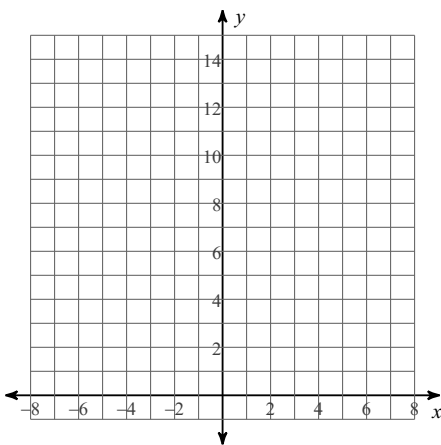


$$19) f(x) = \frac{1}{2} \cdot 4^x + 3$$

Domain:

Range:

Horizontal Asymptote:



$$20) f(x) = 5^x - 7$$

Domain:

Range:

Horizontal Asymptote:

