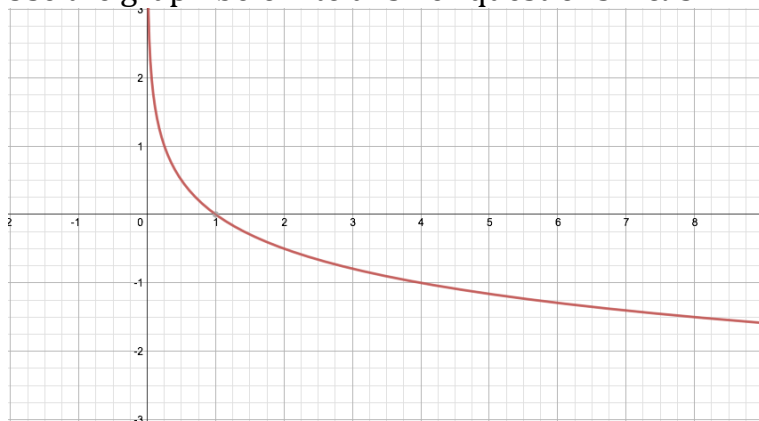


Use the following  $h(x) = \log_3 x$  for problems 1 - 3.

1. Evaluate  $h(81)$ . Show all your work and justify your answer.
2. Evaluate  $h\left(\frac{1}{27}\right)$ . Show all your work and justify your answer.
3. Evaluate  $h(60)$ . Show all your work and determine between which two integers your answer lies between.

Use the graph below to answer questions 4 & 5



4. What type of function is modeled by the graph above?
5. Give an equation for the function and explain your reasoning.

6. The first method of cutting a piece of paper into smaller pieces is to make cuts so that one cut results in two pieces, two cuts results in three pieces, three cuts results in four pieces and so on. The second method of cutting the paper is to fold it onto itself and cut the folded end, then fold the pieces onto themselves and cut their folded ends at the same time. This results in one cut making two pieces, two cuts resulting into four pieces, three cuts resulting into eight pieces and so on.
- Which method represents exponential growth?
  - Write an equation that gives the number  $p$  of pieces in terms of the number  $c$  of cuts for this method.
7. Benjamin grows bacteria. He has 1500 bacteria cells to start with. They grow at 6% compounded continuously.
- Write a model  $m(t)$  that represents the bacteria Benjamin has in  $d$  days.
  - How many bacteria does Benjamin have after 8 days?
  - Approximately when will Benjamin have 4000 bacteria?
8. Jason is studying a species of elephants. The length of the elephant can be modeled by the function  $l(t) = 2 \ln(t - 3.5)$  where  $l$  is the height of the plant in feet and  $t$  is the number of years after birth.
- In the context of this question what is the domain  $l(t)$
  - What is the parent function to Jason's model?
  - Describe how the function  $l(t)$  is transformed from the parent function.

9. Let  $h(x) = \left(\frac{1}{4}\right)^x$

- a. What happens to  $h(x)$  as  $x$  increases without bound?
  
  
  
  
  
- b. What happens to  $h(x)$  as  $x$  decreases without bound?

Domain  $h(x)$ : \_\_\_\_\_ Range:  $h(x)$  \_\_\_\_\_

10. Let  $h(x) = 3 \log_5 x + 5$

- a. Identify the parent function for  $h(x)$ .
  
  
  
  
  
- b. Describe the transformation of  $h(x)$ .
  
  
  
  
  
- c. Graph  $h(x)$

