

Explain, in a (complete) sentence or two, your reasoning.

1. Let  $f$  be the function defined by  $f(x) = \sin(x) + \cos(x)$ , and let  $g$  be the function defined by  $g(u) = \sin(u) + \cos(u)$ , for all real numbers  $x$  and  $u$ . Then
  - A.  $f$  and  $g$  are exactly the same function
  - B. if  $x$  and  $u$  are different numbers,  $f$  and  $g$  are different functions
  - C. not enough information is given to determine if  $f$  and  $g$  are the same

2. If  $f(x) = \frac{x^2-4}{x-2}$  and  $g(x) = x + 2$ , then the functions  $f(x)$  and  $g(x)$  are equal.
  - A. True
  - B. False

Graph these functions. Explain.

3. You were once exactly 3 feet tall.
  - A. True
  - B. False

4. Identify which graph belongs to the functions:

1.  $f(x) = \frac{x^7+3x^3-7x1}{x^2-4},$

2.  $g(x) = \frac{-9x^5-7x^4+2x^2+3x-1}{x^2-2},$

3.  $h(x) = \frac{x^3-3x+7}{x+1}$

A.

B.

C.

The **average rate of change between  $a$  and  $b$**  of a function  $f(x)$  is defined as  $\frac{f(b) - f(a)}{b - a}$ . This is the change in the values divided by the change in the inputs, as the input changes from  $a$  to  $b$ .

Consider the functions

$$g(x) = \frac{1}{10} \cdot 2^x$$

and

$$h(x) = x^2$$

(use just a calculator to answer, only graph at question 8)

5. What is the average rate of change of  $g(x)$ , and of  $h(x)$ , between 0 and 10?

6. What is the average rate of change of  $g$  between 0 and 5, and what is the average rate of change between 5 and 10? The same question for  $h(x)$ .

7. Make a table of the average rates of change of  $g(x)$  and  $h(x)$  between 0 and 1, 1 and 2, 2 and 3, and so on, until 9 to 10.

Interval	Avg R.o.C. of $g(x)$	Avg R.o.C. of $h(x)$
(0, 1)		1
(1, 2)		
(2, 3)		
(3, 4)		7
(4, 5)		
(5, 6)	3.2	
(6, 7)		
(7, 8)		
(8, 9)		17
(9, 10)		

8. Graph the functions  $g(x)$  and  $h(x)$  in the domain between  $x = 0$  and  $x = 20$ . Are they similar? Different? In what ways?