

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. Do you see the patterns?

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?