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

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)

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

5. 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).

6. 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)	0.4	
(3,4)		7
(4,5)		
(5,6)	3.2	
(6,7)		
(7,8)	2.56	
(8,9)		17
(9, 10)		

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

8. Consider the function

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

(a) Graph $2 \cdot f(x)$. Graph $3 \cdot f(x)$. Graph $5 \cdot f(x)$. Graph $10 \cdot f(x)$. Graph $\frac{1}{2} \cdot f(x)$. Meditate.

(b) Graph f(2x). Graph f(3x). Graph f(5x). Graph f(10x). Graph $f(\frac{1}{2}x)$. Meditate.