



Average Rate of Change Homework

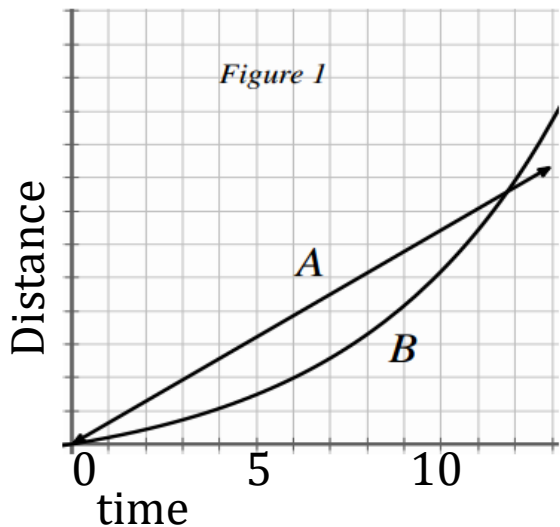
At 1730 feet tall, the Sears Tower in Chicago is the second tallest building in the world! If a penny were let go from the top of the tower, the position above the ground, $s(t)$, of the penny after time, t , in seconds would be $s(t) = -16t^2 + 1730$.

1. Complete the following table:

t (time in seconds)	$s(t)$ (position of the penny above the ground)
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

- Find the average rate of change for the penny on the interval $[0,1]$ seconds.
- Find the average rate of change for the penny on the interval $[6,7]$ seconds.
- Explain why the penny's average speed is different from 0 to 1 second than from 6 to 7 seconds.
- What is the average speed of the penny from $[0,10]$ seconds?

The graph below (*figure 1*) shows the time vs. the distance of two cars traveling in the same direction along the freeway.



6. Which car has the cruise control on? How do you know?

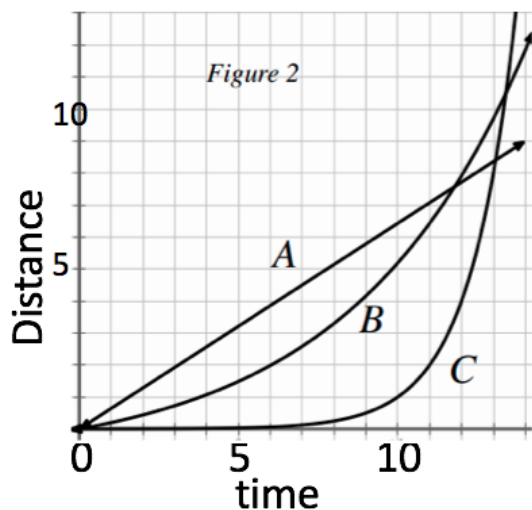
7. Which car is accelerating? How do you know?

8. Identify the interval(s) in *figure 1*, where car A seems to be going faster than car B.

9. Identify the interval(s) in *figure 1*, where car B seems to be going faster than car A.

10. What in the graph indicates the speed of the cars?

11. A third car C is now shown in the graph (see figure 2). All 3 cars have the same destination. If the destination is a distance of 12 units from the origin, which car do you predict will arrive first? Explain your reasoning.



Find the average rate of change of the following functions over the given intervals.

12. $s(t) = 12^t - 3$

a) $[-3,1]$

b) $[2,4]$

13. $h(r) = 3r^2 + 1$

a) $[-3,1]$

b) $[2,7]$

14. $z(x) = 2 - 2^x$

a) $[-3,1]$

b) $[2,7]$

15. $q(u) = 3u + 4$

a) $[-3,1]$

b) $[2,7]$

16. Which function $h(r)$, $z(x)$, or $q(u)$ had the greatest average rate of change over the interval

a) $[-3,1]$

b) $[2,7]$