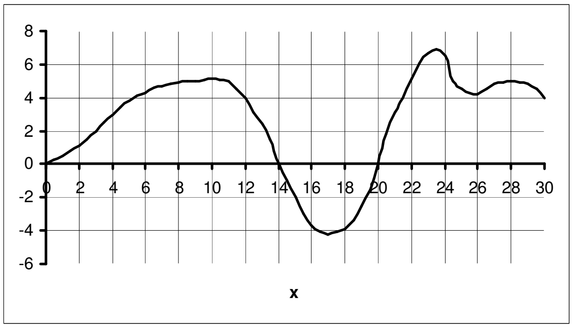
WS10-REPRESENTATIONS NAME___________________________

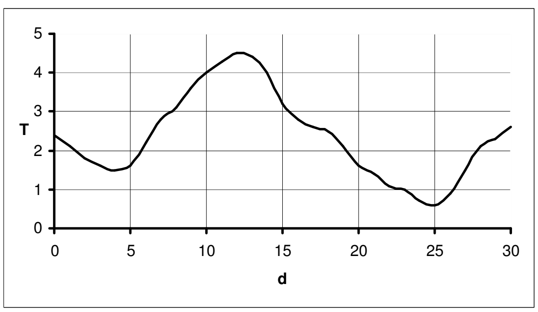
1. Use the graph below to rank the value of each expression from smallest (1) to largest (5), without calculating an exact value. Show your work in the graph.



_____ $f'(4)$ _____ slope of $f(x)$ at $x=22$ _____ $\lim_{h\to 0}\dfrac{f(28+h)-f(28)}{h}$

_____ $\dfrac{f(20)-f(10)}{20-10}$ _____ slope of the tangent line at $x=14$

2. Illustrate each expression on the graph below by sketching a line with the <u>indicated slope</u>. Indicated which line goes with which question. This is not asking for any values just the visual representation.



A. Average rate of change of $T(d)$ between the 5$^{\text{th}}$ and 25$^{\text{th}}$ days.

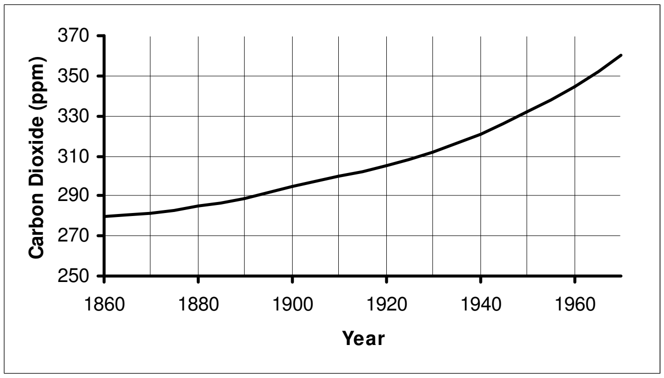
B. Rate of change of $T(d)$ on the 15$^{\text{th}}$ day.

C. $\dfrac{T(10)}{10}$

3. Estimate $L'(35)$ and give a practical interpretation. L is the light output (millions of lumens), and t is the time after ignition (milliseconds) of a No. 22 lightbulb.

Time after ignition	0	5	10	15	20	25	30	35	40	45	50
Light output	0	0.2	0.5	2.6	4.2	3.0	1.7	0.7	0.35	0.2	0

4. **Estimate** $P'(1940)$ and give a practical interpretation. *P* represents the amount of carbon dioxide (ppm) in the atmosphere, *t* represents the year.



5. The speed of a car in mph can be expressed in terms of the length of a skid mark in feet when brakes are applied. Estimate $S'(20)$ and give a practical interpretation if $S(L) = 2\sqrt{5L}$. *(If you get stuck algebraically then make a table)*

6. Suppose a filter has been designed to remove 100 grams of sediment from a storage tank. Let $Q(t)$ be the amount of sediment in the tank at time *t*.

A. Estimate $Q'(3)$ if the filter removes a fixed amount of sediment each hour, say 2.3 grams.

B. Estimate $Q'(3)$ if the filter removes a fixed percentage of sediment each hour, say 20 %. (After you find the equation, make a table to find the derivative.)

C. Give a practical interpretation of $Q'(3)$ for both parts A and B.