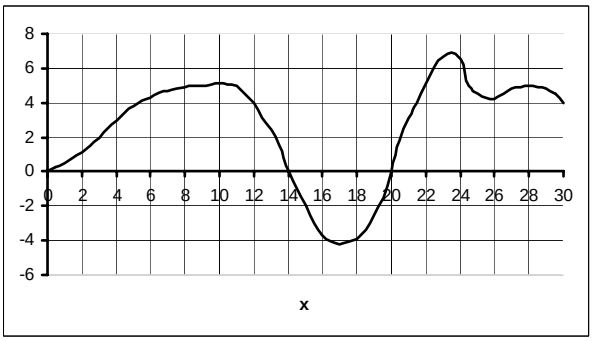
DERIVATIVE REPRESENTATIONS (2.2 & 2.4) NAME_____

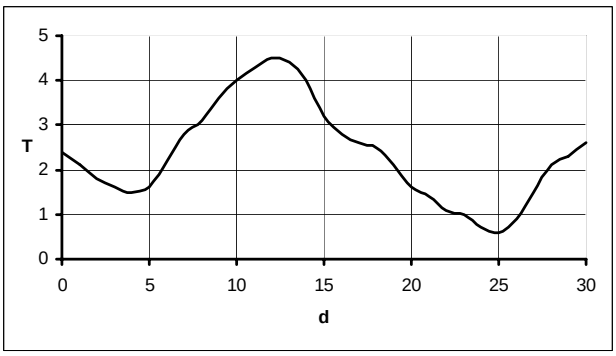
1. Use the graph below to rank the value of each expression from smallest (1) to largest (5).



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

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

2. Illustrate each expression on the graph below by sketching a line with the indicated slope.

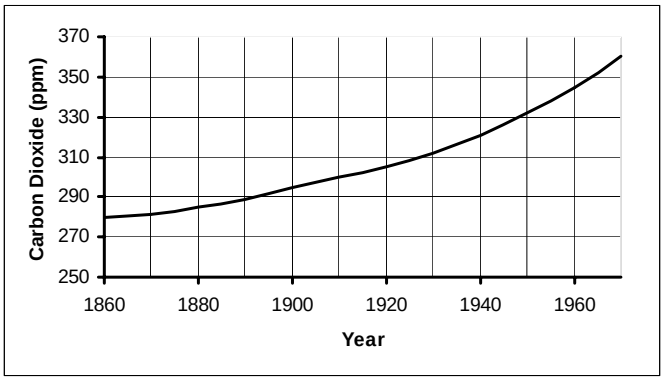


A. Average rate of change of $T(d)$ between the 5th and 25th days.

B. Rate of change of $T(d)$ on the 15th day.

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

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



4. The speed of a car in mph can be expressed in terms of the length of a skid mark in feet when the brakes are applied. Use a difference quotient with $h = 0.0001$ to estimate $S'(20)$ and give a practical interpretation if $S(L) = 2\sqrt{5L}$.

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

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