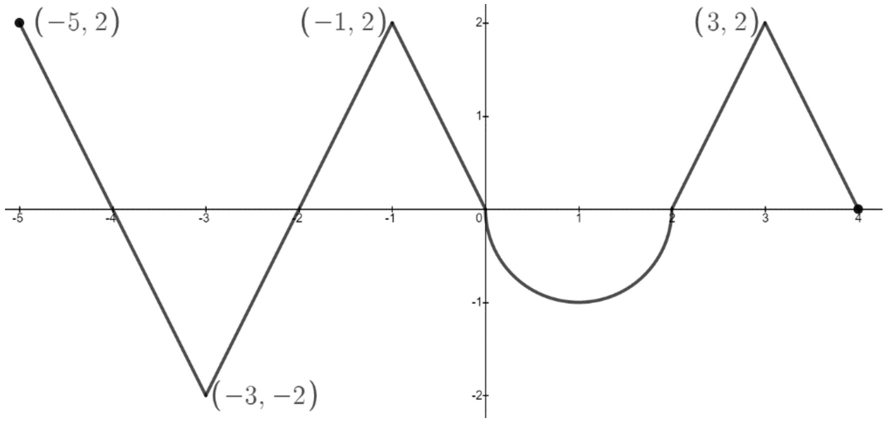
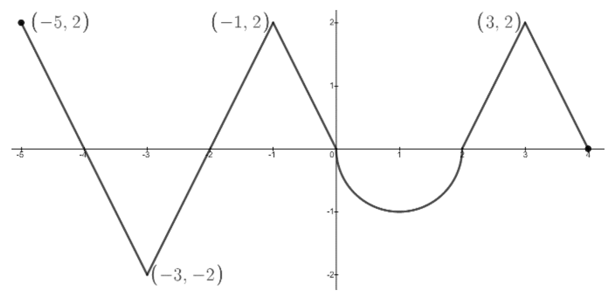
Graphical Stem Medley | **AP Calculus AB – AP Live** | **April 28, 2020**



The graph of f, a continuous function on the interval $-5 \le x \le 4$, is shown above. The graph of f consists of five line-segments and one semi-circle.

Let $C(x) = |f(x)|$ for $0 \le x \le 4$. $C(x)$ models the number of people (in hundreds) in a warehouse x hours after 8:00 am.

(a) Find $C(1)$ and $C'(3.5)$. Using correct units, interpret both in context of this situation.



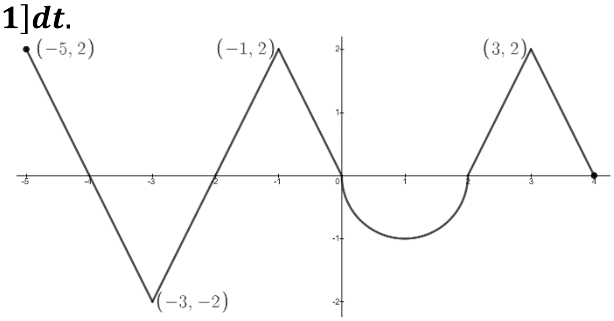
Let $k(x) = \int_0^x f(t)dt$.

(b) Find $k(1)$ and $k'(1)$.

(c) Find the average of rate of change of $k(x)$ on $[-5, 0]$.

(d) Verify $k(x)$ satisfies the Mean Value Theorem on the interval [-5, 0]. State how many times $k'(c)$, the value guaranteed by the Mean Value Theorem, occurs on the interval [-5, 0].

Let h be the function defined by $h(x) = 2 + \int_{-2}^x [f(t) - 1]dt$.



(e) Find $h(-2)$, $h'(-2)$, and $h''(-2)$.

(f) Find $h(0)$ and $h(-5)$.

(g) Write an equation of the tangent line to $h(x)$ at $x = -2$.

(h) On what open interval(s) is the function $h(x)$ increasing and concave up? Explain your reasoning.

(i) Evaluate $\lim_{x \to 1} \dfrac{k(x) + \arctan x}{2x - h(x - 3)}$.