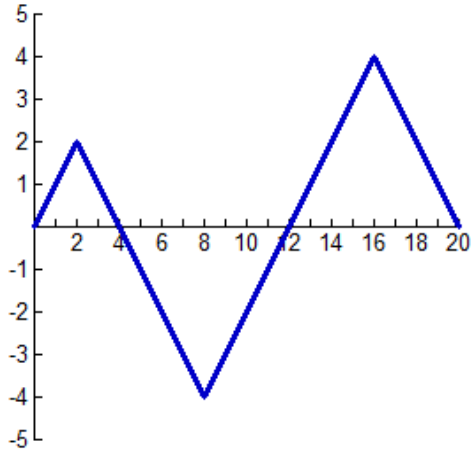
My Really Big Chapter 4 Problem _____



graph of f

The continuous function f is defined on the interval $0 \le x \le 20$. The graph of f consists of four line segments as shown in the figure above. Let $g(x) = 2 + \int_4^x f(t)\,dt$.

(a) Find the following values [remember to show ALL steps]: $g(0)$, $g(4)$, $g(12)$ and $g(20)$

(b) Find $g'(x)$ and evaluate $g'(16)$

(c) Write the equation of the tangent line to the graph of g at $x=16$ and then find the linear approximation for $g(16.1)$

(d) For what intervals is the graph of g increasing? Justify completely.

(e) Find the $x-$values of any relative extrema on the graph of g

(f) Find the values of the ***absolute*** extrema for the graph of g [Clearly show all of your candidates]

(g) For what intervals is the graph of g concave down? Justify completely.

(h) Find the average rate of change of f [not g] on interval $2 \le x \le 16$. There is no point $c,\ 2 < c < 16$ for which $f'(c)$ is equal to that average rate of change. Explain why this statement does not contradict the Mean Value Theorem.

(i) Find all values of $x, 0 < x < 20$ for which the graph of g has a point of inflection. Give a Calculus-based reason for your answer.

(j) On the axes provided below, draw a sketch of the graph of g