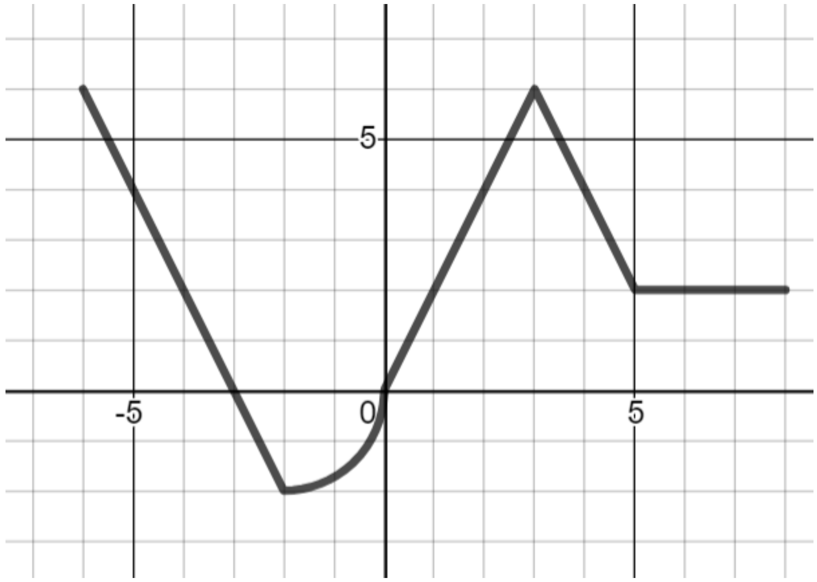
Practice BC Exam 2020 -- 3

Patrick Honner
www.PatrickHonner.com

Question 1 (25 minutes)



The graph of $g(x)$ for $-6 \le x \le 8$ is shown above, which for $-2 \le x \le 0$ is part of the circle centered at $(-2,0)$. Let $f(x) = \int_0^x g(t)\,dt$.

(a) Find the average rate of change of $g(x)$ on $[-6,8]$.

(b) $f(0) = 0$. Does there exist another value of x on $-6 \le x \le 8$ such that $f(x) = 0$? Justify your response.

(c) Determine all intervals on which $f(x)$ is concave down.

(d) Find the maximum value of $f(x)$ on $[-6,8]$.Justify your response.

(e) Write the second-degree Taylor polynomial for $f(x)$ centered at $x = 4$.

Patrick Honner
www.PatrickHonner.com

Question 2 (15 minutes)

The functions $f(x)$ and $f'(x)$ are defined on $1 \le x \le 4$ and $|f'(x)| \le 4$ for $1 \le x \le 4$.

x	1	1.5	2	2.5	3	3.5	4
$f(x)$	*6.2*	*5.0*	*4.6*	*4.8*	*5.2*	*5.8*	*6.8*
$f'(x)$	*-2.0*	*-1.2*	*0.5*	*0.8*	*1.2*	*2.4*	*1.8*

(a) Estimate the value of $f''(2.5)$.

(b) Use a left-endpoint Riemann sum with three equal subinterval to estimate the average value of $f(x)$ on $1 \le x \le 4$.

(c) Explain why $f(2.25) < 6$.

(d) The region bounded by the function $y = f(x)$ and the *x*-axis for $1 \le x \le 4$ is revolved about the line $y = 10$. Set up an integral expression involving $f(x)$ for the volume of the resulting solid of revolution.