My Chapter 4 Review 2009

1. $\int \frac{x^2 - x}{\sqrt{x}}\, dx$

2. If $f(x) = 2 + g(x)$ for $-1 \le x \le 1$, then what is the value of $\int_{-1}^{1} [f(x) - g(x)]\, dx$?

3. $\int_{-3}^{7} |\, x + 2 \,|\, dx$

4. If $f(x) = \int_{3}^{\tan x} \left(1 - t^2\right) dt$, then $f'(x) = ?$

5. $\int_{0}^{x} -\cos t \, dt =$

6. If $\int_{1}^{c} \frac{1}{x^2} \, dx = \frac{1}{2}$, then $c =$

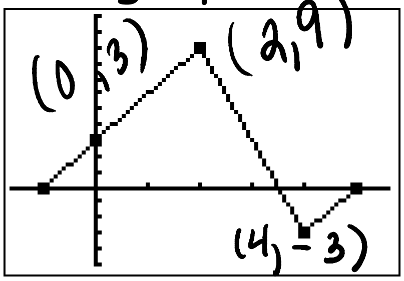
7. $\dfrac{d}{dx}\int_{0}^{x} -\cos t \; dt$

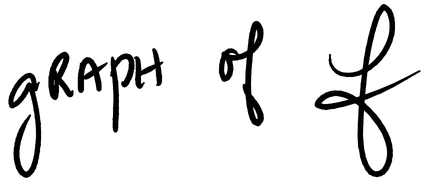
8. $\int_{0}^{5} (3x+1)^2 \; dx =$

9. If $g(x) = \int_{1}^{x} \sec(2t+3)\,dt$, then $g'(x) =$

FREE RESPONSE

The graph below is the graph of f on [-1, 5]





Let $g(x) = \int_0^x f(t)\,dt$

(A) Find $g(0)$, $g(-1)$ and $g(2)$

(B) Find $g'(x)$ and any critical value(s) of $g(x)$

(C) Find any relative extrema of $g(x)$

FR [calculator-friendly]

During a recent snowfall, several students monitored the accumulation of snow on the flat roof of their school. The table records the data they collected for the 12-hour period of the snowfall.

Number of hours (t)	**Rate of Snow [R(t)] (inches/hr)**
0	0
2	1.5
3	2.1
4.5	2.4
6.5	2.8
8	2.2
10.5	1.8
12	1.6

(A) Use a left-hand Riemann sum to approximate $\int_0^{12} R(t)\, dt$ and explain the real-life meaning.

(B) Use your left-hand Riemann sum to estimate the average rate of snowfall in the 12-hour period. Remember to show your set-up!

The problem above is a variation on a problem from the AMSCO AP Calculus preparation book [which I paid for!]