Topics for Chapter 5 Test 1

1) Anti-Derivatives and Initial Value Problems

2) The Definite Integral
   a) Integral: $\int_a^b f(x)\,dx = F(b) - F(a)$
   b) Total Area: $\int_a^b |f(x)|\,dx$ or $\int_a^c f(x)\,dx - \int_c^b f(x)\,dx$
   c) Average Value of a Function: $\frac{1}{b-a}\int_a^b f(x)\,dx$
   d) Using the definite integral to solve problems involving particle motion

3) Riemann Sums
   a) Left Hand Method
   b) Right Hand Method
   c) Midpoint Method

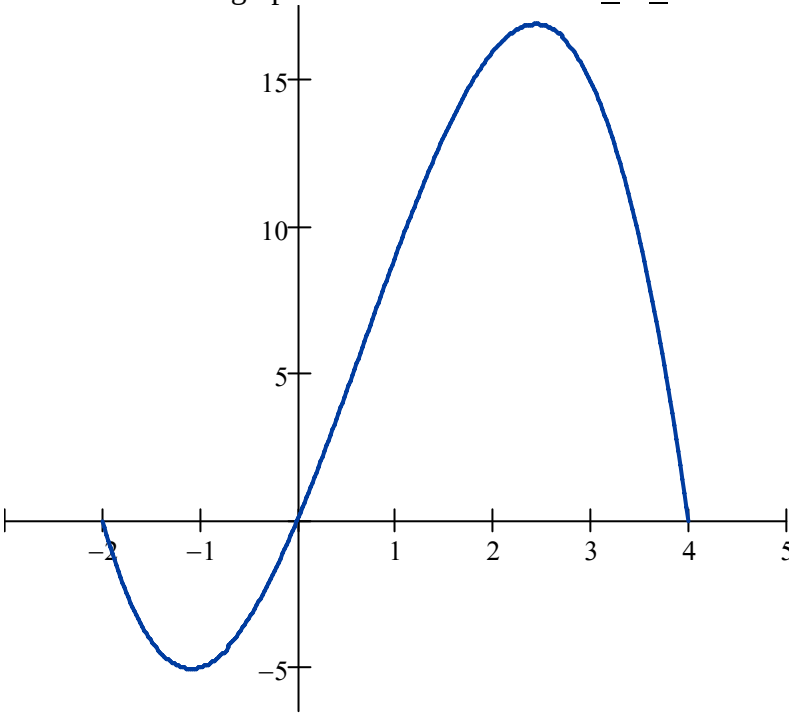
A calculator is allowed but no notes of any kind are.

Name_____

Chapter 5 Review 1

Complete the given problems on a separate sheet of paper. Attach this sheet when you turn in your work. Your graphing calculator may be needed for parts of these problems.

1) The function $f(x) = 8x + 2x^2 - x^3$ is graphed over the interval $-2 \leq x \leq 4$ below.



(a) Approximate the value of $\int_0^4 f(x)\,dx$ using a left Riemann sum with four subintervals.

(b) Approximate the value of $\int_0^4 f(x)\,dx$ using a midpoint Riemann sum with four subintervals.

(c) Use the definite integral to find the exact value of $\int_{-2}^4 f(x)\,dx$

(d) Use the definite integral to find the exact value of the total area between the curve and the x-axis over the interval $[-2, 4]$

2) A particle, initially at rest, moves along the x-axis so that its acceleration at any time $t \geq 0$ is given by $a(t) = 12t^2 - 4$. The position of the particle when $t = 1$ is $x(1) = 3$.

(a) Write an expression for the velocity $v(t)$ of the particle at any time $t \geq 0$.

(b) Find the values of t for which the particle is at rest.

(c) Write an expression for the position $x(t)$ of the particle at any time $t \geq 0$.

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3) Given $\int_{-1}^{2} f(x)\,dx = 1$, $\int_{4}^{-1} f(x)\,dx = 5$, and , $\int_{2}^{6} f(x)\,dx = -3$, find

(a) $\int_{2}^{4} f(x)\,dx$

(b) $\int_{4}^{6} f(x)\,dx$

(c) $\int_{-1}^{6} f(x)\,dx$