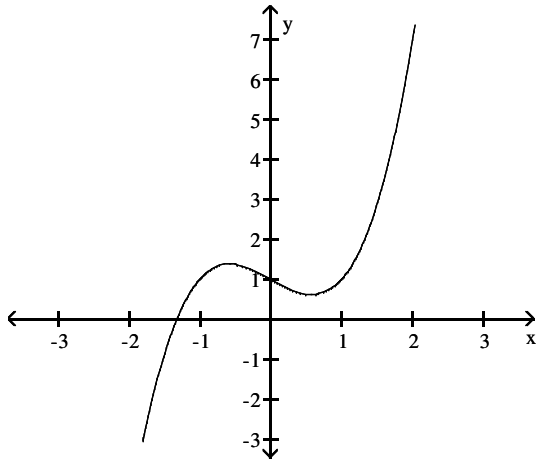
Name_____

Activity - Integration Practice

1) Consider the function $f(x) = x^3 - x + 1$ on the interval $[-1, 2]$, shown below:



Riemann Sums:

Use **three** rectangles to approximate the area under the curve from $x = -1$ to $x = 2$.

a) Using right endpoints

b) Using midpoints

Using the limit definition of a definite integral. (see Definition Section 5.2). You may need the Sums and Powers of Integers Section 5.1.

Find $\int_{-1}^{2} (x^3 - x + 1)\, dx$

Antiderivatives:

Find the general antiderivative $\int (x^3 - x + 1)\, dx$

The Fundamental Theorem of Calculus:

Use the FTC to evaluate $\int_{-1}^{2} (x^3 - x + 1)\, dx$

In questions 2 – 4 use the Fundamental Theorem of Calculus Part 1 to find each derivative.

2) $g(x) = \int_1^x \frac{dt}{t}$

3) $y = \int_0^{x^{10}} \cos\sqrt{t}\, dt$

4) $f(x) = \int_0^{3 \ln x} e^t\, dt$

In questions 5 – 8 find the integral.

5) $\int_0^{\pi/3} \cos x\, dx$

6) $\int_1^{32} (2e^x - \sqrt[5]{x})\, dx$

7) $\int \left(\frac{3}{x^2 + 1} - \frac{7}{x} \right) dx$

8) $\int 4^x\, dx$

9) Find the <u>total area</u> (not the net area) of the region between the curve and the x–axis. Hint: sketch the graph and determine how to break up the function to find the area.

$y = x^2 - 4x + 3$ on the interval $0 \le x \le 4$

10) Given the velocity and initial position of a body moving along a coordinate line at time t, find the body's position s at time t.

$v = \cos \frac{\pi}{2} t$, $s(0) = 1$