

PRACTICE
EXAM
#2

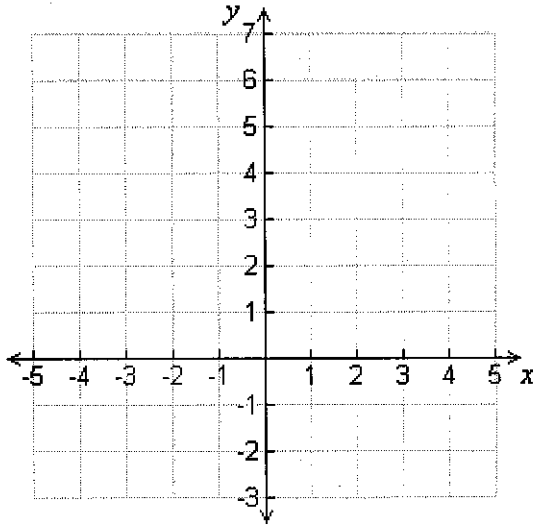
INTEGRATION

AP Calculus
Date _____

Name _____
Period _____

Problem Set 5.4 – 2 Fundamental Theorem of Calculus

1. Evaluate $\int_{-1}^3 (-2x + 4) dx$ by sketching a graph and using a geometry formula.



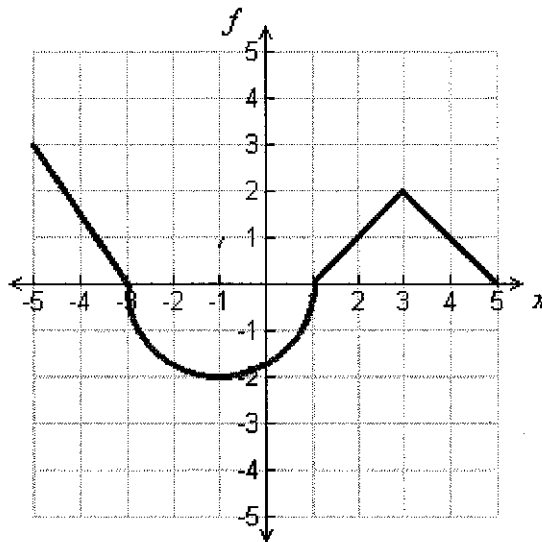
2. Evaluate $\int_{-1}^3 (-2x + 4) dx$ using numerical integration on your calculator.

3. Evaluate $\int_{-1}^3 (-2x + 4) dx$ using the Fundamental Theorem of Calculus.

4. ~~4~~. Find the average value of the function $f(x) = \sin\left(\frac{1}{2}x\right)$ on $\left[\frac{\pi}{2}, \pi\right]$.

5. ~~10~~. The graph of f consists of straight line segments and a semicircle as shown below.

$$H(x) = \int_1^x f(t) dt$$



- Find $H(5)$.
- Find $H(1)$.
- Find $H'(-1)$.
- Find $H(-5)$.
- Find $H''(4)$.

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Problem Set 5.1,5.5 – Estimating Definite Integrals with Rectangles, Trapezoids

6. A particle starts at $x = 0$ and moves along the x -axis with velocity $v(t) = t^2 + 1$ for time $t \geq 0$. Where is the particle at $t = 5$? Approximate the area under the curve using five rectangles of equal width and heights determined by the midpoints of the intervals.

7. A rectangular swimming pool is 30 ft wide and 50 ft long. The table below shows the depth $h(x)$ of the water at 5-ft intervals from one end of the pool to the other. Estimate the volume of water in the pool using right-endpoint values.

Position (ft) x	Depth (ft) $h(x)$
0	6.0
5	8.2
10	9.1
15	9.9
20	10.5
25	11.0
30	11.5
35	11.9
40	12.3
45	12.7
50	13.0

$$8. \int_0^1 (8x^3 - 12x^2 + x) dx =$$

$$9. \int_1^{27} x^{-4/3} dx =$$

$$10. \int_1^4 \frac{dt}{t\sqrt{t}} =$$