MATH 160 Session #28 – Fundamental Theorem of Calculus

1. **Evaluate each of the following:**

   a. $\int (5x^2 + 2\sqrt{x})dx$

   b. $\int 50e^{0.05t}dt$

2. **A ball is launched vertically upward from 4 feet above ground level in such a way that it's velocity in ft/sec t seconds after being launched is given by v(t) = -32t + 128.**

   a. **Suppose s(t) = the ball's distance in feet above the ground t seconds after being launched. Specify a rule for s(t).**

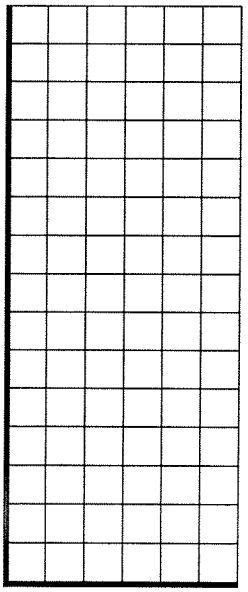
   b. **What is the total distance traveled by the ball between the time it is launched and the monent 4 seconds have elapsed?**
   (We will denote this value by $\int_0^4 (-32t + 128)dt$.)

   c. **What is the total distance traveled by the ball between the end of the 2nd second and the moment 4 seconds have elapsed?**
   (We will denote this value by $\int_2^4 (-32t + 128)dt$.)

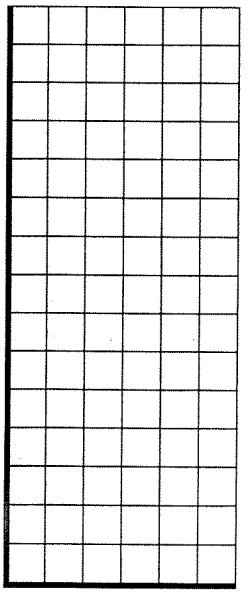
   d. **Sketch the graph of v(t) over the interval $0 \le t \le 4$ on each of the two grids below. Label your axes and identify the scale on each axis.**

   e. **Shade the triangular region bounded by the graph of v(t), the t-axis, and line t = 4. Find the area of that region. Verify that the area is also s(4) – s(0). (Use Graph 1)**

   f. **Shade the hexagonal region bounded by the graph of v(t), the t-axis, and the line t = 2. Find the area of that region. Verify that the area is also s(4) – s(2). (Use Graph 2)**



Graph 1.



Graph 2.