Ch 5 Activity – 34 pts

Name:

1. (10 pts) Use the limit process strategy to find the area of the region between the graph of the function $f(x) = 3 + 4x - x^2$ and the x-axis over $[1,4]$.

    Theorem: If f is continuous and nonnegative on closed [a, b], then

    $$A = \lim_{n \to \infty} \sum_{i=1}^{n} f(c_i)\Delta x \text{ where } \Delta x = \frac{b-a}{n} \text{ and } c_i = a + i\Delta x.$$

    a) Sketch the area.
    b) Find Δx, c_i, and $f(c_i)$ and plug them into the sum.
    c) Evaluate the sum with respect to i.
    d) Evaluate the limit with respect to n.

2. (4 pts) Use the FTC part 2 to find dy/dx for $y = \int\limits_{\tan x}^{0} \dfrac{dt}{1+t^2}$.

3. (4 pts) Evaluate $\int 3x^2 \sin(x^3)dx$

4. (5 pts) $\int x\sqrt{x+3}\,dx$

5. (5 pts) Evaluate the definite integral. Clearly indicate u and du and the new limits of integration.

a. $\int_0^1 x\left(x^2 + 1\right)^{15} dx$

6. (6 pts) Find the area of the shaded region.

y=sinx