4.4 Day 2 ws (*integrating with respect to y and applications*)

1. $\int_0^2 \left(2y - y^2\right) dy = y^2 - \frac{1}{3}y^3 \,|_0^2 = \left((2)^2 - \frac{1}{3}(2)^3\right) - \left((0)^2 - \frac{1}{3}(0)^3\right) = \frac{4}{3}$

2. $\int_0^1 y^4 dy = \frac{1}{5}y^5 \,|_0^1 = \frac{1}{5}$

3. i. a. Displacement = $\int_0^3 (3t - 5)\, dt = -1.5$ meters

   b. Distance = $\int_0^3 |3t - 5|\, dt = 6.833$ meters

   ii. a. Displacement = $\int_1^6 \left(t^2 - 2t - 8\right) dt = -3.333$ meters

   b. Distance = $\int_1^6 \left|t^2 - 2t - 8\right| dt = 32.666$ meters

4. i. a. Velocity = $\int (t + 4)\, dt = \frac{1}{2}t^2 + 4t + C$, initial velocity is 5, $v(t) = \frac{1}{2}t^2 + 4t + 5$

   b. Distance = $\int_0^{10} \left|\frac{1}{2}t^2 + 4t + 5\right| dt = 416.666$ meters

   ii. a. Velocity = $\int (2t + 3)\, dt = t^2 + 3t + C$, initial velocity is -4, $v(t) = t^2 + 3t - 4$

   b. Distance = $\int_0^3 \left|t^2 + 3t - 4\right| dt = 14.833$ meters