AP Calculus
4.4 application notes

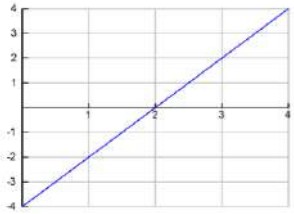
$$\int_2^5 P'(t)\,dt = P(t)\Big|_2^5$$

$$\int_1^4 v(t)\,dt = s(t)\Big|_1^4$$

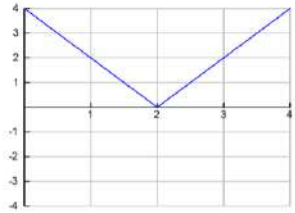
Suppose you are driving at 40 mph (60 ft/sec) and you decide to pass a truck. Assume that t seconds after you start accelerating, your velocity is given by $v = 60 + 6\sqrt{t}$. If it takes you 10 seconds to pass the truck, how much distance will you have covered?

What is the difference between ***total displacement*** and ***total distance traveled***?

$$\int_0^3 (2t-4)\,dt$$



$$\int_0^3 |2t-4|\,dt$$



A particle moves left to right w/ a velocity of $v(t) = t^2 - t - 6$. **math9 - fnint(derivative, x, lower, upper)*

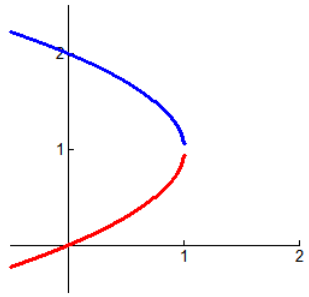
a) find the displacement of the particle from $1 \le t \le 4$.

b) find the total distance traveled from $1 \le t \le 4$.

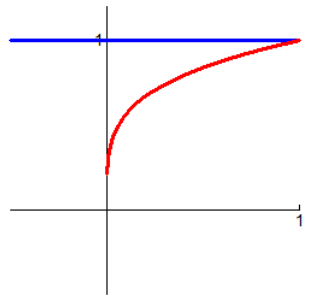
AP Calculus name_____

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

1. The area of the region that lies to the right of the *y*-axis and to the left of the parabola $x = 2y - y^2$ is given by the integral $\int_0^2 (2y - y^2)dy$. Find the area of the region.



2. The boundaries of the shaded region are the *y*-axis, the line $y = 1$, and the curve $y = \sqrt[4]{x}$. Find the area of this region by writing *x* as a function of *y* and integrating with respect to *y*. Make sure to set the integral up first.



3. The velocity function (in meters per second) is given for a particle moving along a line. Find:
   a. The displacement of the particle during the given time interval.
   b. The distance traveled by the particle during the given time interval.
      i. $v(t) = 3t - 5$, $0 \le t \le 3$

      ii. $v(t) = t^2 - 2t - 8$, $1 \le t \le 6$

4. The acceleration function (in m/s^2) and the initial velocity are given for a particle moving along a line. Find:
   a. The velocity at time *t*.
   b. The distance traveled during the given time interval.
      i. $a(t) = t + 4$, $v(0) = 5$, $0 \le t \le 10$

      ii. $a(t) = 2t + 3$, $v(0) = -4$, $0 \le t \le 3$