

AP Calculus
4.4 application notes (4.4 Day 2)

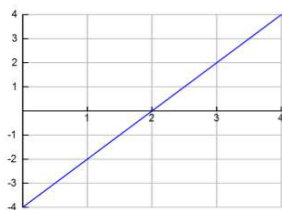
$$\int_2^5 P'(t) dt = P(t) \Big|_2^5$$

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

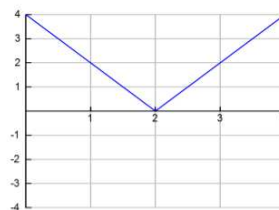
Suppose you are driving at 40 mph (60 ft/sec) and you decide to pass a truck. Assume that t seconds after you start accelerating, your velocity is given by $v = 60 + 6\sqrt{t}$. If it takes you 10 seconds to pass the truck, how much distance will you have covered?

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

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



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



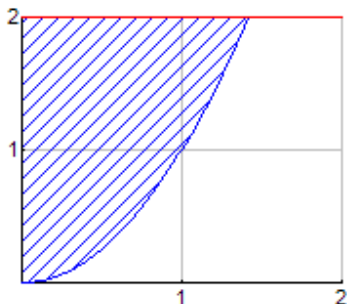
A particle moves left to right w/ a velocity of $v(t) = t^2 - t - 6$. **math9 - fnint(derivative, x, lower, upper)*

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

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

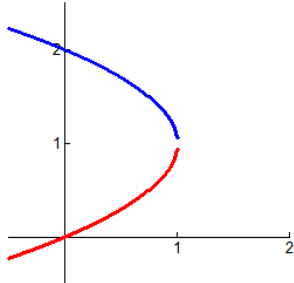
Integration towards the y-axis, find the following area.

$$f(x) = x^2$$

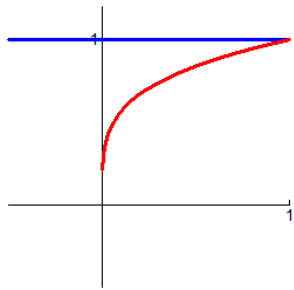


4.4 ws (integrating with respect to y and applications)

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. $v(t) = 3t - 5, 0 \leq t \leq 3$
 - ii. $v(t) = t^2 - 2t - 8, 1 \leq t \leq 6$
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. $a(t) = t + 4, v(0) = 5, 0 \leq t \leq 10$
 - ii. $a(t) = 2t + 3, v(0) = -4, 0 \leq t \leq 3$