Today's Plan:

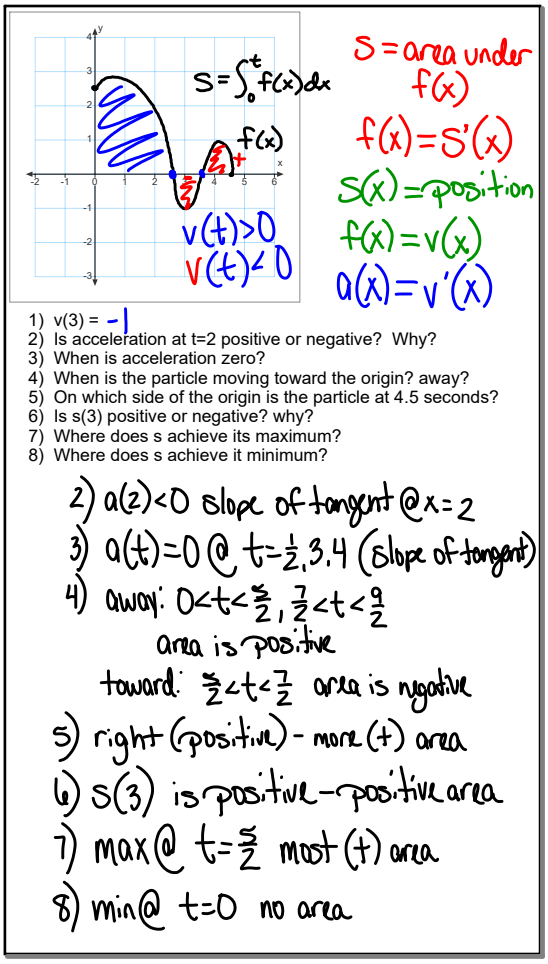
Learning Target (standard): I will find the area of a region. I will use the area of the region to describe other quantities.

Students will: Complete practice problems over previous concepts at the boards, put up homework problems on the board and make necessary corrections to their own work, take notes over new material and complete practice problems over new concepts.

Teacher will: Provide practice problems over previous concepts, check homework problems for accuracy and provide students feedback, describe and provide examples of new concepts and assign students assessment problems over new concepts.

Assessment: Board work, homework check and homework assignment

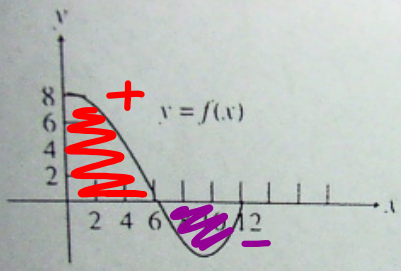
Differentiation: Students will work at the board, go over and correct homework at their seats, actively engage in lecture over new concepts, practice new concepts with the aid of other students and the teacher and complete homework assignment.



53. Let

$$H(x) = \int_0^x f(t)\,dt.$$

where f is the continuous function with domain $[0, 12]$ graphed here.



$H(x) = area$

$H(x) = F'(x)$

$f(x) = H'(x)$

$f'(x) = H''(x)$

(a) Find $H(0)$. H(0)=0 no area @x=0

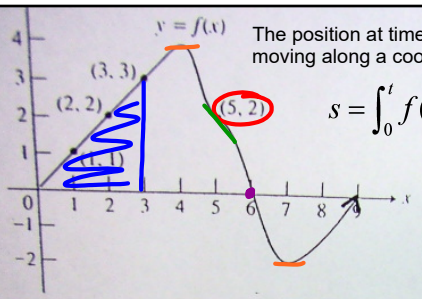
(b) On what interval is H increasing? Explain. (0,6) - area is getting bigger

(c) On what interval is the graph of H concave up? Explain. H''(x)>0 (10,12)

(d) Is $H(12)$ positive or negative? Explain.

(e) Where does H achieve its maximum value? Explain. @x=6

(f) Where does H achieve its minimum value? Explain. @x=0



The position at time t(seconds) of a particle moving along a coordinate axis is

$$s = \int_0^t f(x)dx \text{ meters}$$

(a) What is the particle's velocity at time $t = 5$? v(5)=2

(b) Is the acceleration of the particle at time $t = 5$ positive or negative? slope of tangent is negative

(c) What is the particle's position at time $t = 3$? $s=\int_0^3 f(t)dt = \frac{9}{2}$ m

(d) At what time during the first 9 sec does s have its largest value? greatest area @t=6sec

e) When is acceleration zero? slope of tangents is 0 @t=4,7 sec

f) When does the particle move toward the origin? away?

g) On which side of the origin does the particle lie at t=9?

f) away - area gets larger
0<t<6
toward - area gets smaller
6<t<9

g) positive side - more positive area than negative area

Find the area of the region bounded by:

1) $y = x^4 - 2x^3 + 2$
$x = -1$
$x = 2$
$A = {}^{51}/_{10}u^2$

2) $y = x^4$
$y = 2x - x^2$
$A = {}^{7}/_{15}u^2$

3) $y^2 = 4x$
$4x - 3y = 4$
$A = {}^{125}/_{24}u^2$

4) $y = x^3 - 2x^2 + x - 1$
$y = -x^2 + 3x - 1$
$A = {}^{37}/_{12}u^2$

5) $y = 2x + 1$
$y = -\frac{3}{2}x + \frac{9}{2}$
$y = \frac{1}{4}x - \frac{5}{2}$
$A = {}^{63}/_{4}u^2$

Watch videos on solids of revolution by Monday:

https://www.khanacademy.org/math/ap-calculus-ab/volume-using-calculus-ab/disk-method-ab/v/disk-method-around-x-axis

https://www.khanacademy.org/math/ap-calculus-ab/ab-applications-definite-integrals/ ab-disk-method/v/disc-method-around-y-axis