

WEEK 8: JUNE 29<sup>th</sup> - JULY 6<sup>th</sup>

0.1. Suggested Problems.

§5.4: #3, 7, 9, 11, 21, 25, 40, 50, 62 & 64

§5.5: #13, 16, 21, 29 & 33

§5.6: #7, 11, 17, 18, 21, 29 & 49

§5.7: #7, 17, 19, 33, 35, 51, 57 & 72

§5.8: #2, 4, 8, 10 & 24

§11.7: #4, 7, 23, 26 & 34

§6.1: #7, 9, 17, 29, 36, 38 & 45

§6.2: #7, 15, 19, 25, 37, 43 & 57

§6.3: #9, 11, 19, 23, 39 & 44.

0.2. Assigned Problems. Due July 7<sup>th</sup>, in lecture.

- (1) As a particle moves about the plane, its  $x$ -coordinate changes at the rate of  $t - 2$  units per second and its  $y$ -coordinate changes at the rate of  $\sqrt{t}$  units per second. If the particle is at the point  $(3, 1)$  when  $t = 4$  seconds, where is the particle 5 seconds later? (*This is 5.6.48*)

- (2) Let  $f$  be continuous at  $c$ .

(a) Prove that if  $f(c) > 0$ , then there exists  $\delta > 0$  such that  $f(x) > 0$  for all  $x \in (c - \delta, c + \delta)$ .

(b) Prove that, if  $f$  is continuous on  $[a, b]$  and

$$\int_a^b |f(x)| dx = 0,$$

then  $f(x) = 0$  for all  $x \in [a, b]$ . (*Hint: use part (a). This is 5.8.30*)

- (3) The base of a solid is the region bounded between the parabolas  $x = y^2$  and  $x = 3 - 2y^2$ . Find the volume of the solid given that the cross sections perpendicular to the  $x$ -axis are:

(a) rectangles of height  $h$ ;

(b) equilateral triangles;

(c) isosceles right triangles, hypotenuse on the  $xy$ -plane.

(*This is 6.2.30*)