

Week 4: June 2nd - June 8th

Suggested Problems

Problems you may find instructive, or that I find interesting.

§3.1 #7, 15, 21, 25, 27, 34, 35, 37, 40, 41, 50 & 59

(Note that #72 was already suggested, §2.3 #61.)

§3.2 #13, 20, 23, 29, 33, 44, 50, 57, 61 & 64

Product Rule is extremely important. If you have time, do as many of #1-44 as you can.

§3.3 #19, 29, 35, 39, 53, 55, 61 & 64

(Note that #29 is a lot easier if you split the fraction.)

§3.5 #9, 15, 21, 25, 27, 55, 57, 59, 61 & 62

(Question #61 might seem more interesting if compared with §3.6.)

Chain Rule is extremely important. If you have time, do as many of #1-28 as you can.

§3.4 #6, 11(B) & 16

§3.6 #7, 9, 19, 24, 28, 29, 33, 41, 47, 53, 58, 61 & 71

(Question #71 is an example of a *differential equation*.)

§3.7 #9, 15, 18, 25, 29, 43, 47 & 58

§4.10 #18, 23, 29 & 39

Assigned Problems

Due **June 9th**, in lecture.

1. Set

$$g(x) = \begin{cases} x, & x \text{ rational} \\ 0, & x \text{ irrational,} \end{cases} \quad p(x) = \begin{cases} x^2, & x \text{ rational} \\ 0, & x \text{ irrational.} \end{cases}$$

(a) Show that g is **not** differentiable at 0.

(b) Show that p is differentiable at 0, and give $\left. \frac{dp}{dx} \right|_{x=0}$.

This is §3.1 #52; you might find it helpful to do #59 first.

Hint: to save writing, recall that in §2.2 we proved the Dirichlet function has no limit.

2. Find the angles at which the circles $(x - 1)^2 + y^2 = 10$ and $x^2 + (y - 2)^2 = 5$ intersect.

This is §3.7 #48; you might find it helpful to do #47 first.

3. Calvin's spherical snowball is melting in a way so that the radius changes at a constant rate. When he took the snowball out of the freezer it had a radius of 16cm, but after 30min the radius is 10cm. How fast is the volume of the snowball changing when the radius is 12cm?

This is §4.10 #14.