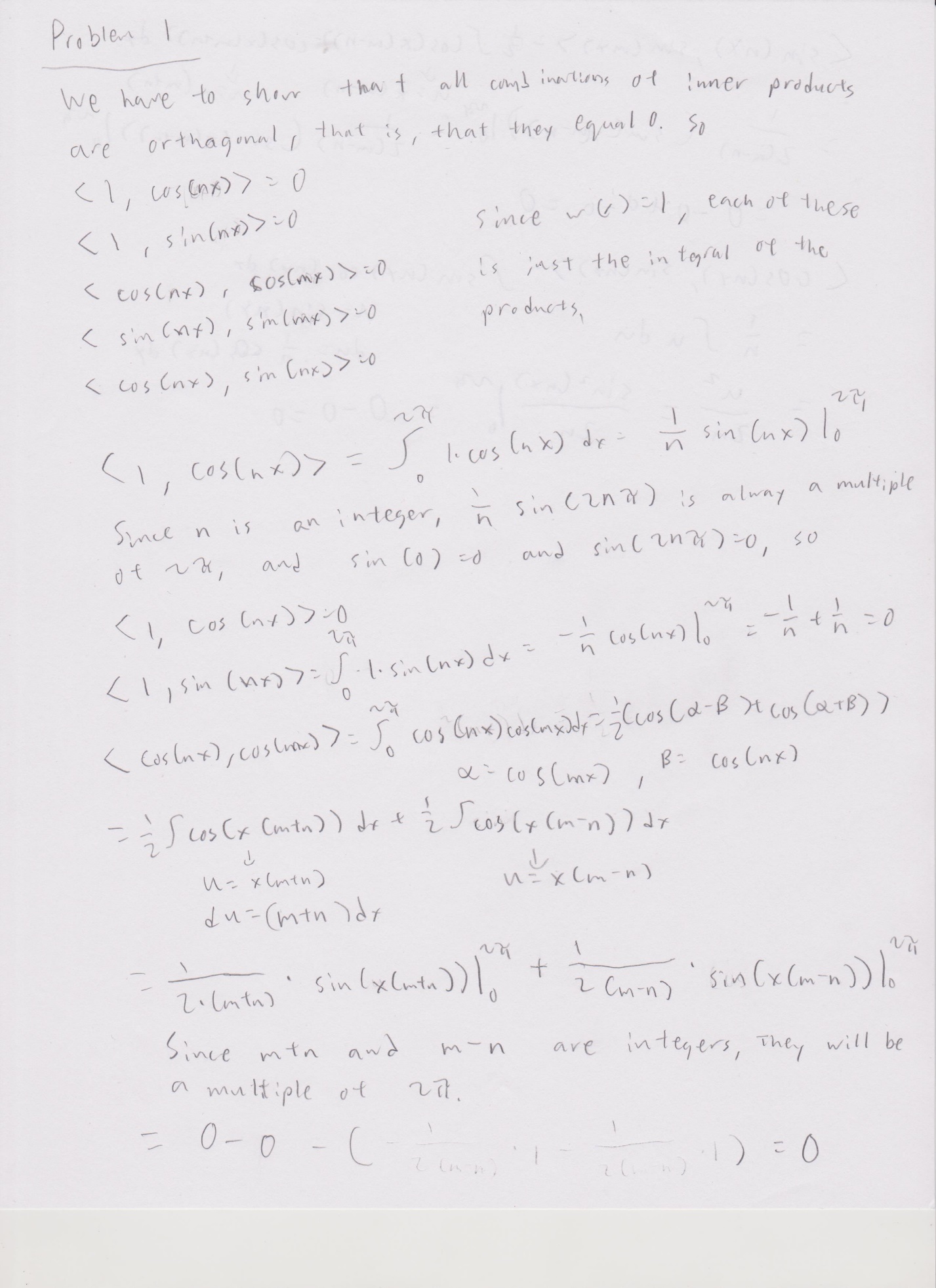
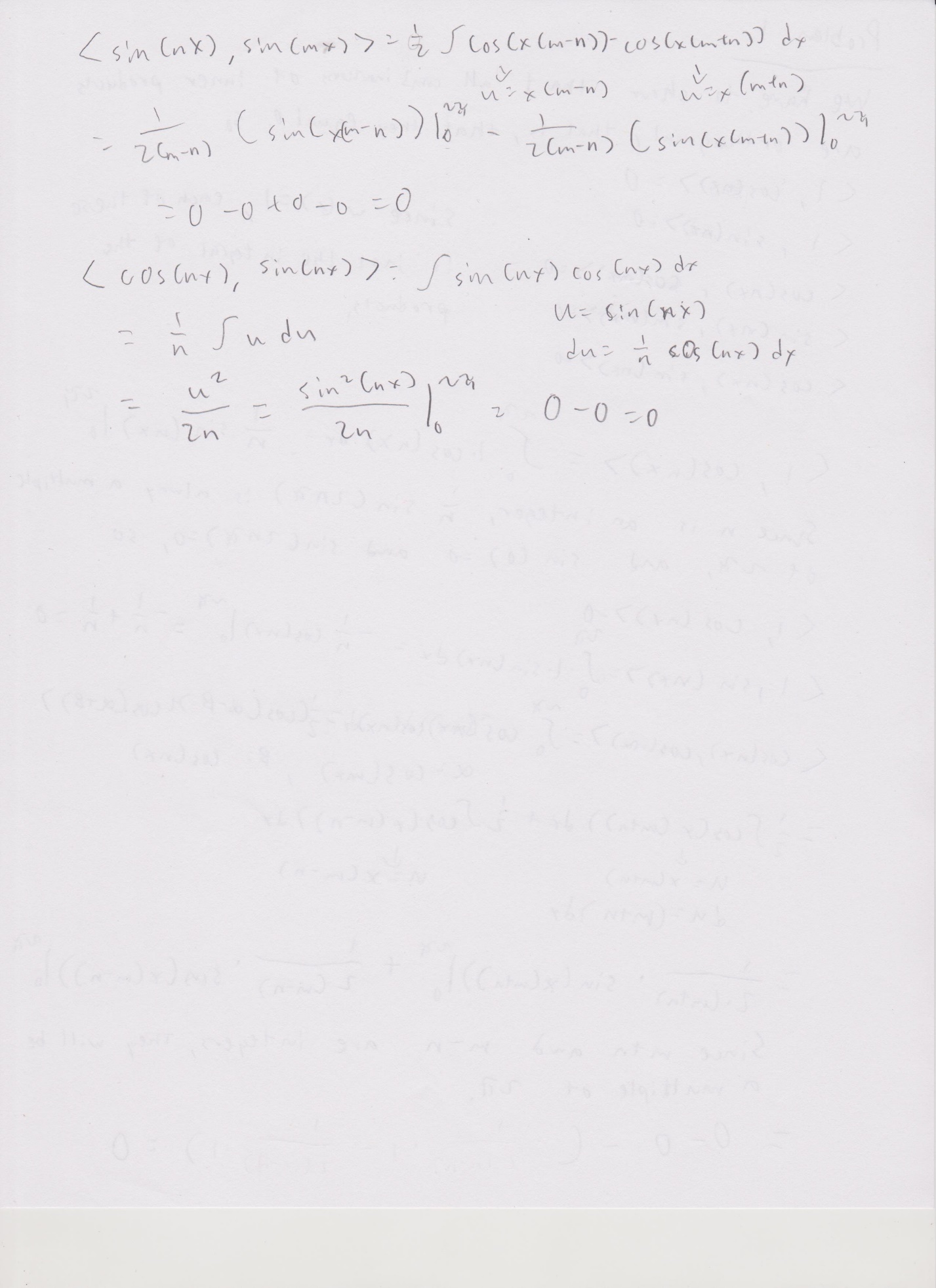
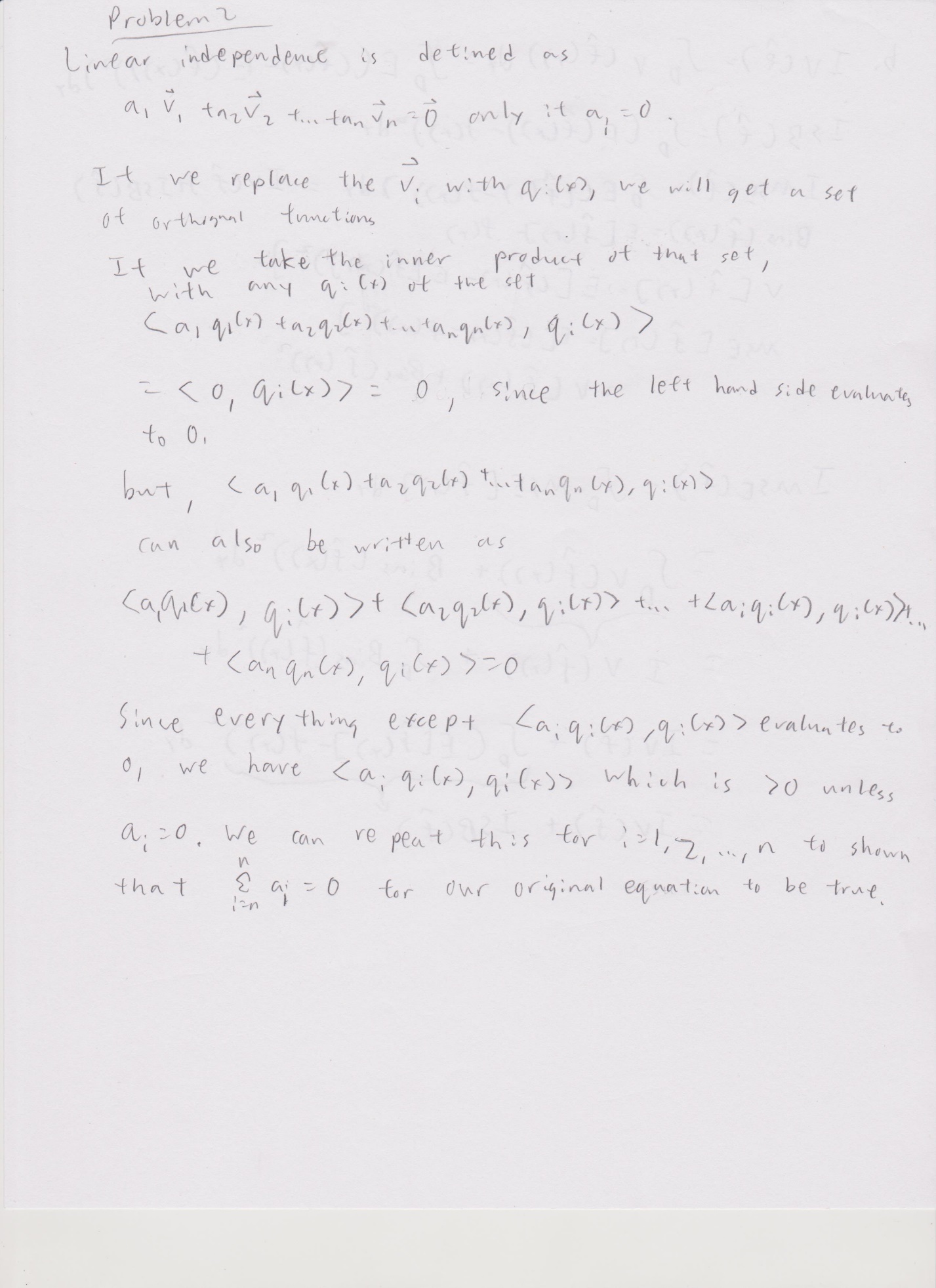
HW10

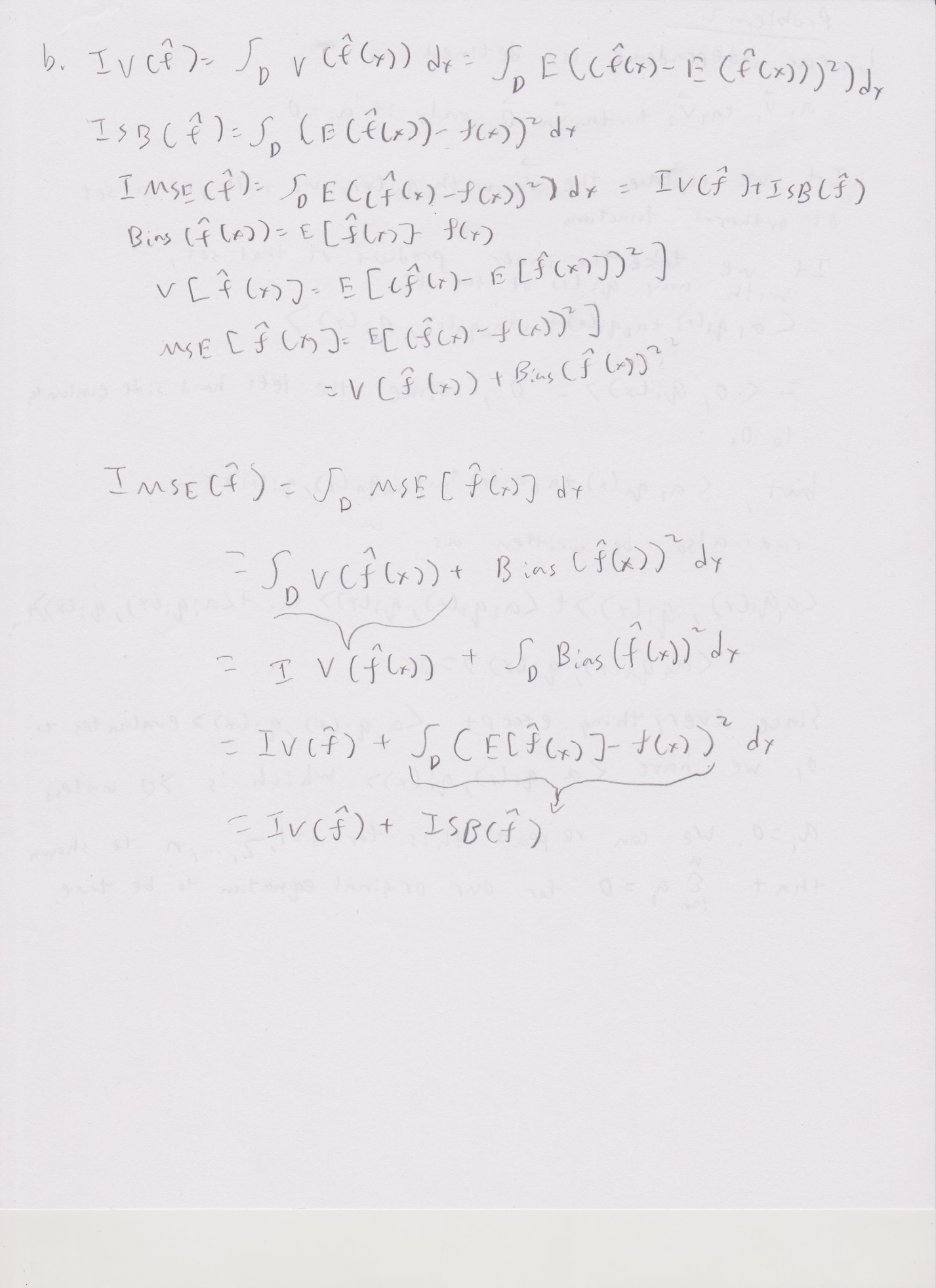
Yichen Dong

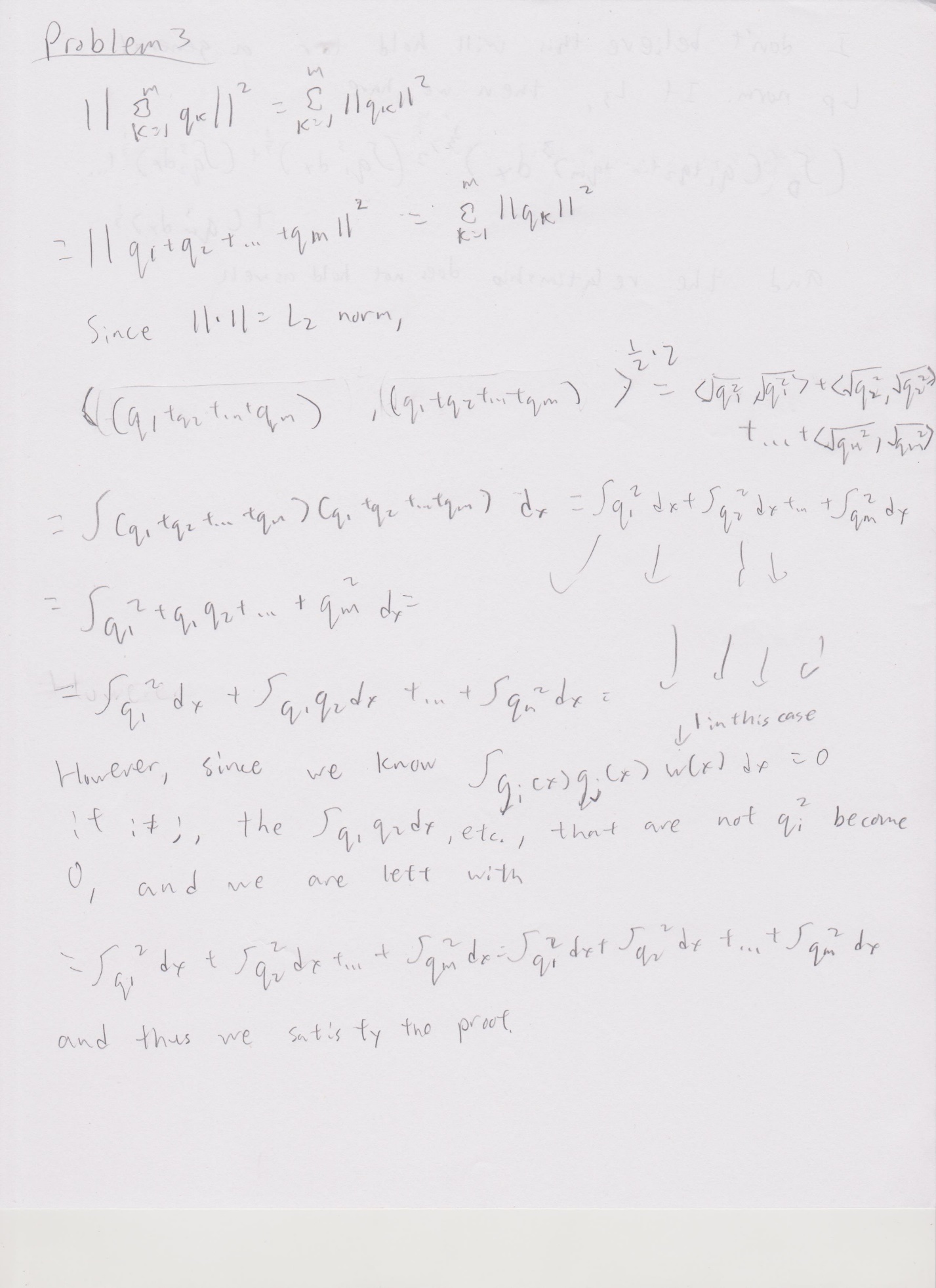
November 8, 2018

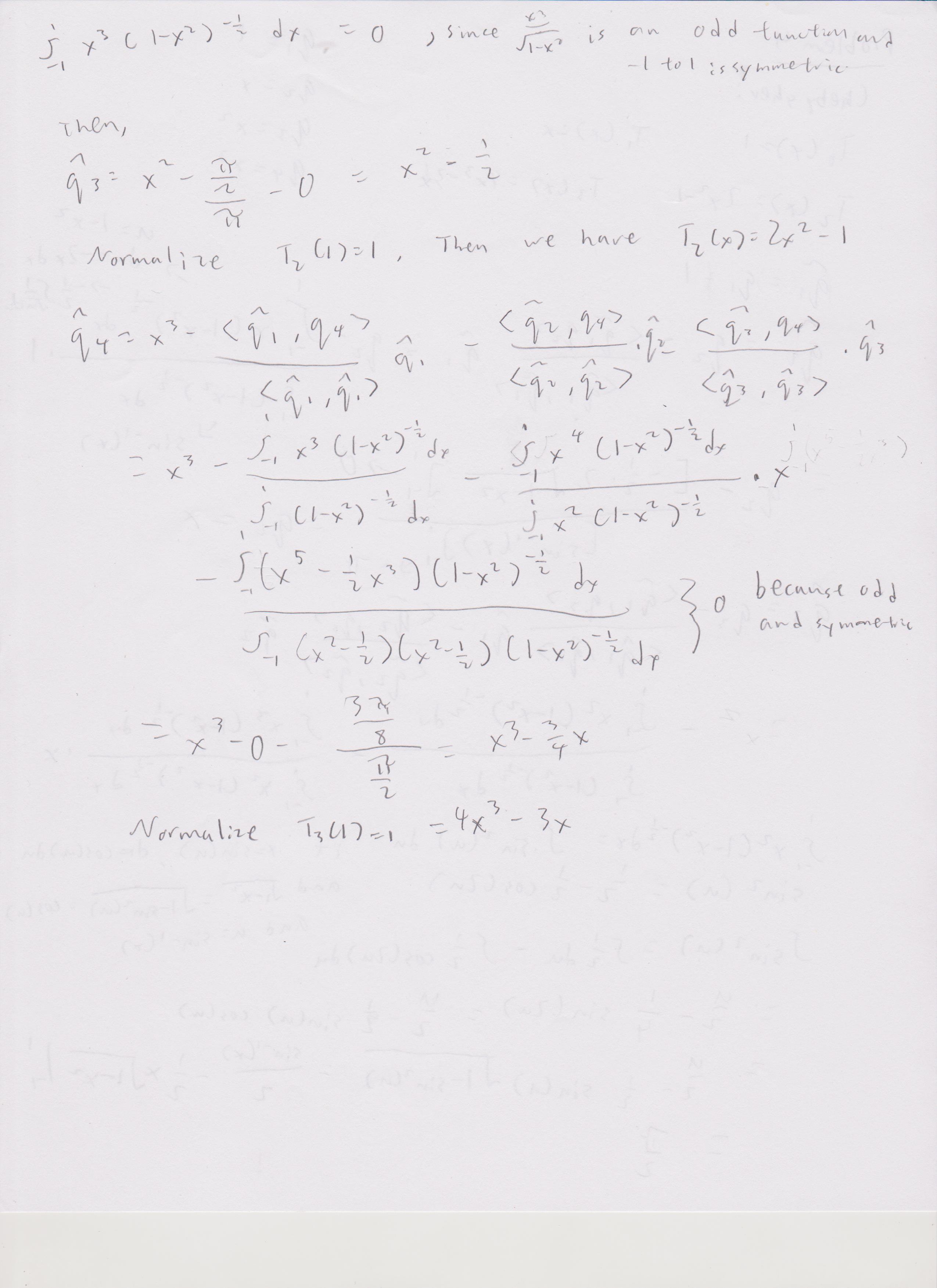
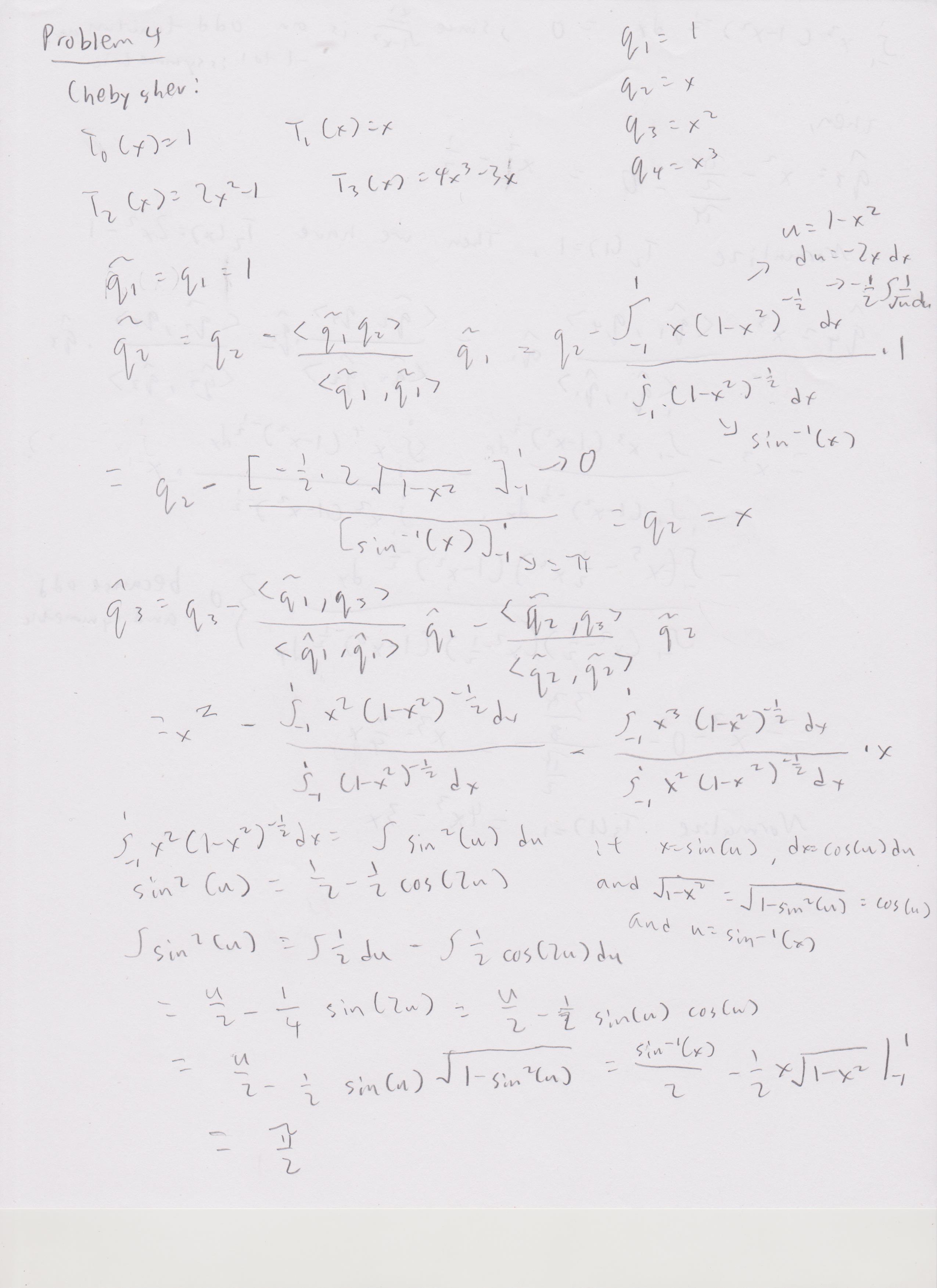
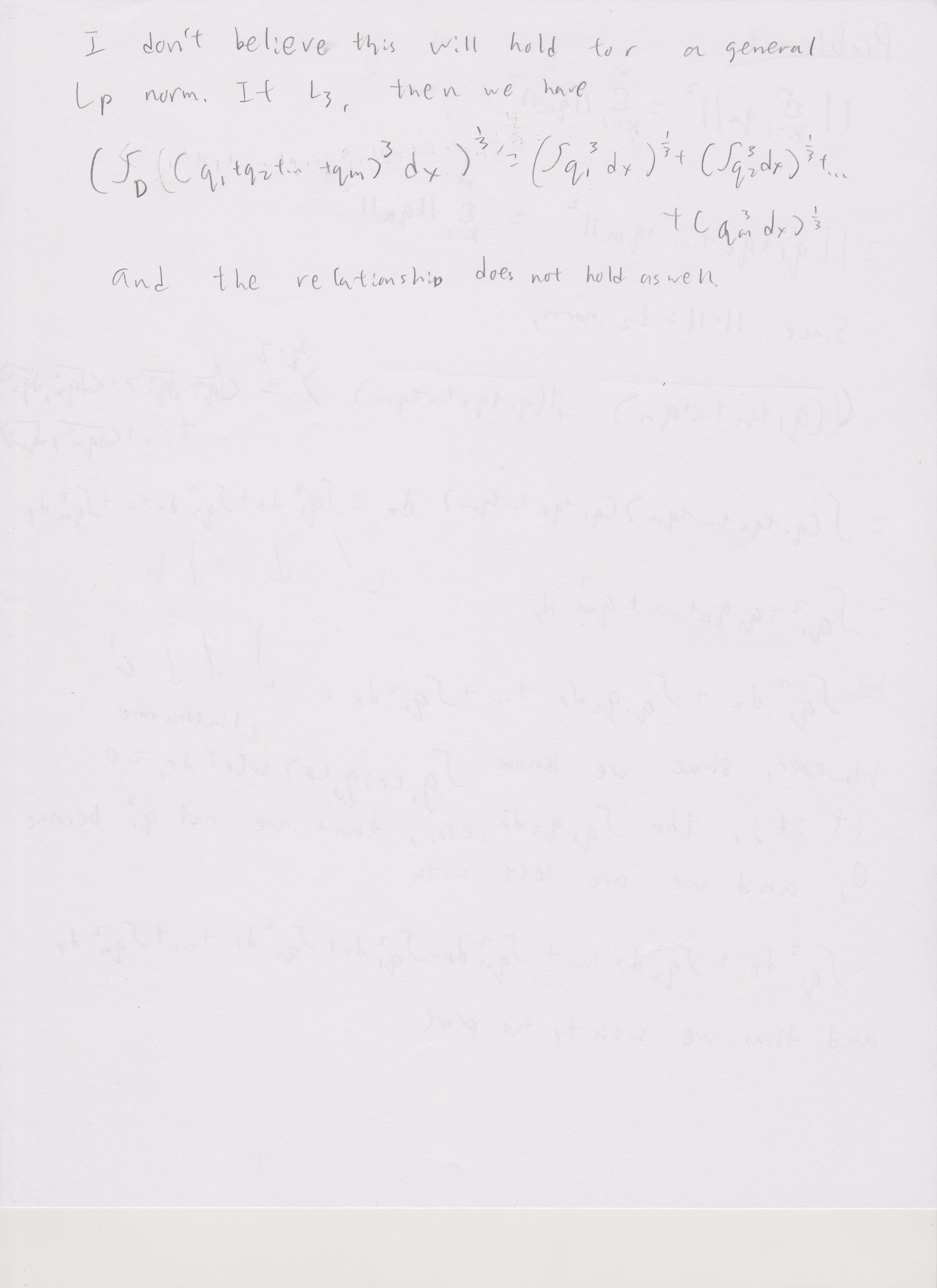












## Problem 4b

library(dplyr)

##   
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':  
##   
## filter, lag

## The following objects are masked from 'package:base':  
##   
## intersect, setdiff, setequal, union

ortho = scan("Orthogonal.txt")  
q1 = function(x){1}  
q2 = function(x){x}  
q3 = function(x){2\*x^2-1}  
q4 = function(x){4\*x^3-3\*x}  
g\_x = function(x){dnorm(x,0,.3)}  
n = length(ortho)  
  
c\_1 = 1/n\*sum(q1(ortho)\*g\_x(ortho))  
c\_2 = 1/n\*sum(q2(ortho)\*g\_x(ortho))  
c\_3 = 1/n\*sum(q3(ortho)\*g\_x(ortho))  
c\_4 = 1/n\*sum(q4(ortho)\*g\_x(ortho))  
  
c\_1

## [1] 0.9410636

c\_2

## [1] -0.00415153

c\_3

## [1] -0.8583737

c\_4

## [1] 0.01297196

sum(c\_1\*q1(ortho))

## [1] 0.9410636

sum(c\_2\*q2(ortho))

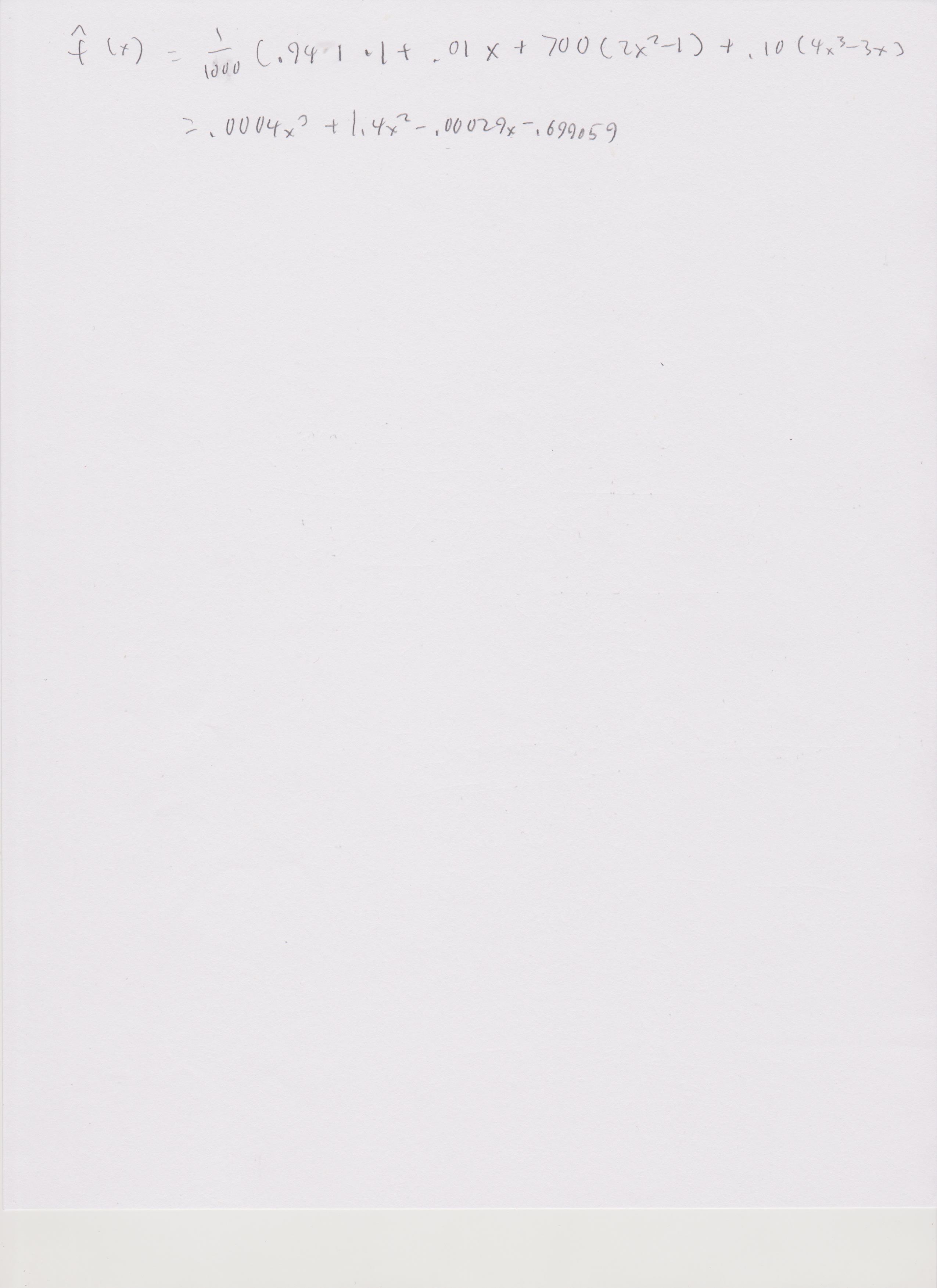
## [1] 0.01014201

sum(c\_3\*q3(ortho))

## [1] 700.3602

sum(c\_4\*q4(ortho))

## [1] 0.1002212



f\_hat\_x = function(x){.0004\*x^3+1.4\*x^2-.00029\*x-.699059}  
ortho = as.data.frame(ortho)  
ortho = ortho %>%  
 mutate(f\_hat = f\_hat\_x(ortho),  
 dnorm = dnorm(ortho,0,.3))

I definitely don’t think I did this right. I might have misunderstood what q(x) meant or what g(x) is supposed to be, because my answers do not make any sense whatsoever.

