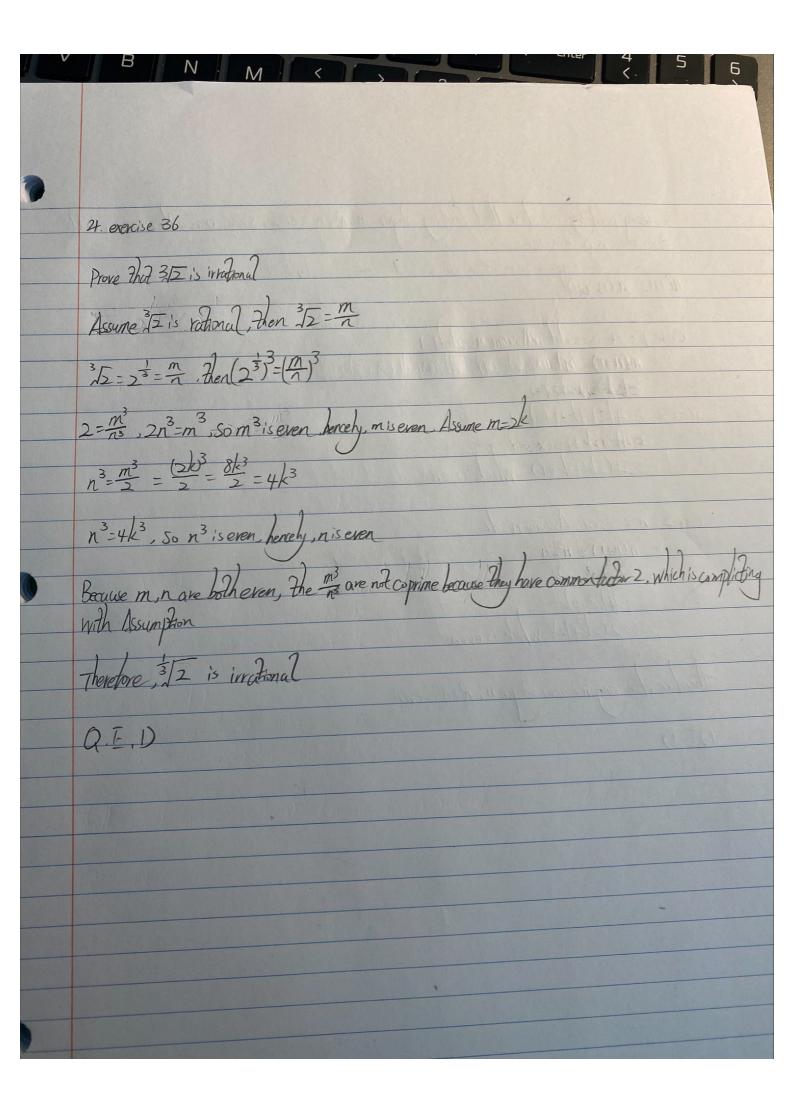
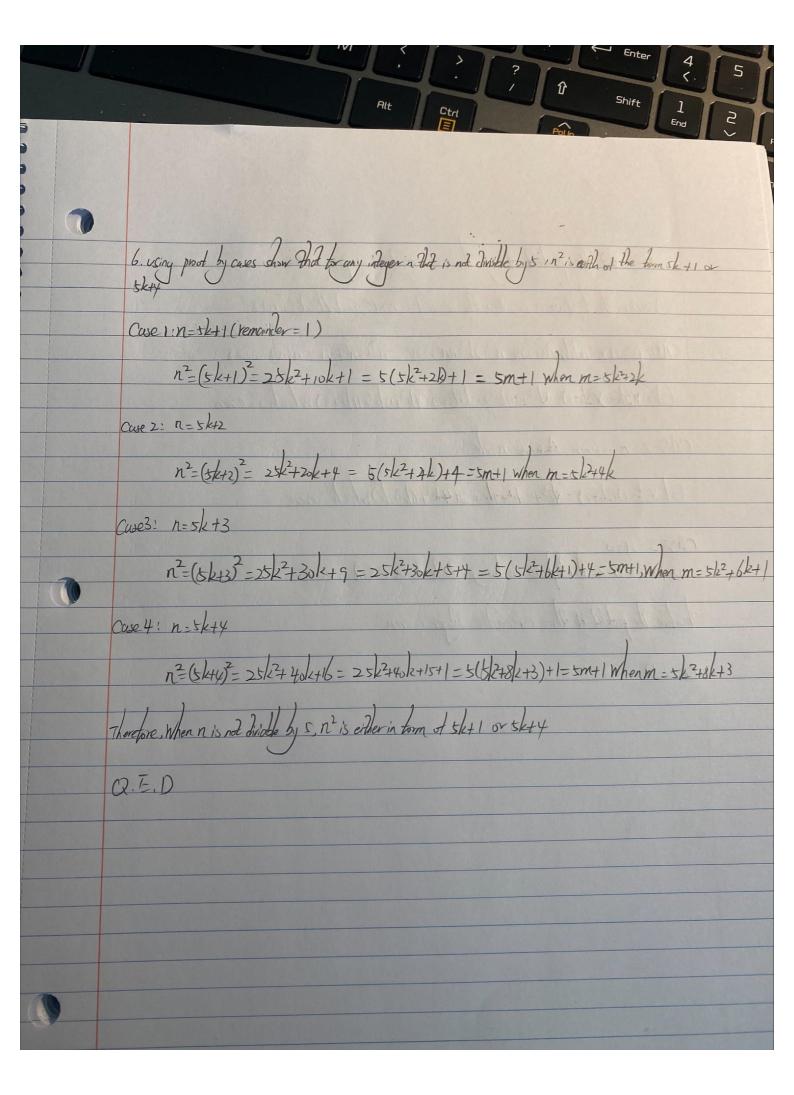
Week 07 Assymment 1. exercise 6 USE a proof by case I show that min(a, min(b,c)) = min(min(a,b),c), whoseever as b, core real number case 1, a=5=C min(a, min(b,c)) = a = b = cmin(min(a,b),c)) = a = b = ccase 2 a is the smallest min(a, min(bx))= min(a, borc) = a min(min(a,b),c)=min(a,c)=aCase 3 bis the smallest min (a. min (b.c)) = min (ab) = b min (min(a,b), c)= min(b,c)=b Cuse 4. Cis smallest min(asmin(b,c)) = min(a,c) = c min(min(a,b),c) = min(a or b,c) = c In all cases. The min(a, min(b,c)) and min(min(a,b),c) has the same out put therefore They are equal Q.F.1)

2 exercise 8 Prove using the notion of without loss of generality that sx+sy is an odd number when x could are integers of apposite parity 5x+5y = 5(x+y) Without loss of operating we assume x=2/2+1, which is odd, y=2h, which is ever x+y= 2k+1+2h= 2(k+h)+1 which is odd 5(2(k+h)+1) = 10(k+h)+5 is also oil Therefore 5x+5y is always odd when x and y are integers of opposite parity. Q.E.D 3 exercise 24 Use forward reasoning to show that it x is a non-zero real number, then of  $x^{2}+x^{2}\geq 2=x^{2}+x^{2}\geq 0=x^{2}+x^{2}\geq 0=(x^{2})^{2}-2(x^{2})\times 1+1^{2}$ (x=1) = (x+1)(x-1)2 >0 (x+1) is non-negative (x+1) is non-negative, so (x+1) is always non-negative except at x=0. Q.E.D



Assume nis non-zero That for any integer n n2+n is even. Since o is either even or all n2+n=n(n+1) Case 1: n is odd Assume n=2k+1

n(n+1)=n+n  $= (2k+1)^2 + 2k+1$   $= 2k+1)^2 + 2k+1$ =4k2+6k+2 = 2(2k2+3k+1) Which is even Cusez: n is even, Assume n: 2/2  $n(n+1) = n^2 + n$ =(>k)2+2k  $= \frac{4k^2+2k}{2(2k+1)}$  which is even Therefore for any non-zero interpr n. n2+n is even QED



7. prove that the product of any three consecutive integer is even Assume The firstone is n, then the second is n+1 and thind is n+2 CASE III n'is odd Assume n=2k+111 311 1337 1211 11 (2k+1)(2k+2)(2k+3)-8k3+24/2+2)k+6=2(4k3+12k2+11k+3) Which is even CASTO2: n is even, Assume n:2k (2k)(2/c+1)(2/c+2) = 8/c3+12/c2+4/2 = 2(4k3+6/232/e) which is even OXIX2 = 0 2 this depends on how you trade it in CS it is even Therefore, the product of three concentre integer is even Q.F.D

