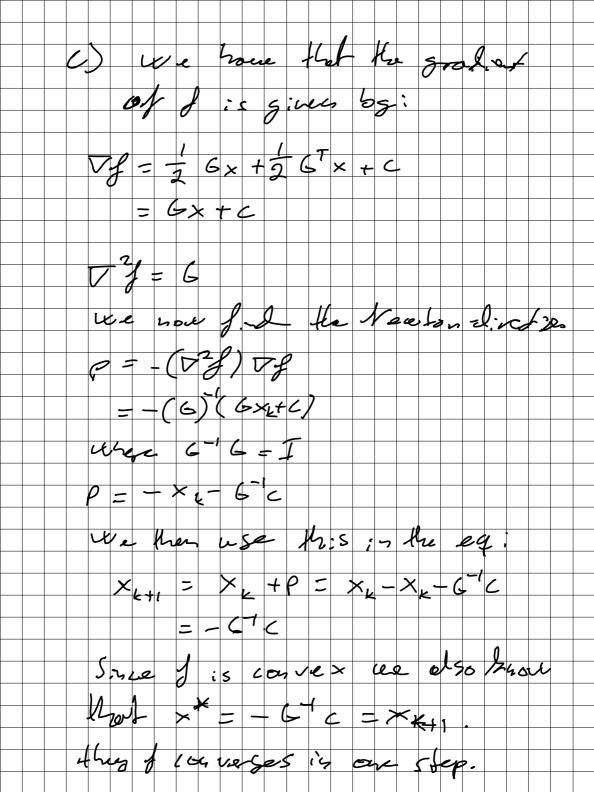
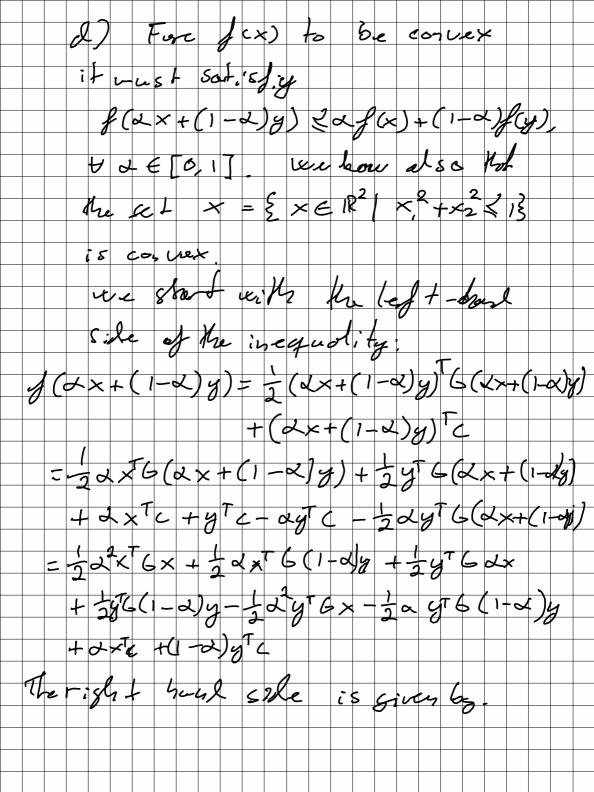
ASSignment 8 Problem 1 a) Theren 2.3 11 xx is a local minim: Ze of of and I f exists and is continued in an open neighborhool of x#, then of (x*) = 0 and of (x*) is Positive sonidedisite. 6) Fran 2.2 ve som Met Vf (x*)=0, becase x* is the lowest point (mean: no its a minimize). This is prove by contradiction, ossening lat D2 f (xx) is not pos. tive San: Lefin, he. In the good we Sel Het this can't be so become

we end up ix. It a decreasing function after a taylor expossion around xx. Thus, V2f(x*) nash be positive semi definite. c) The lifference lies in 2.3 only aslang V2f(x*) to be position Sanidefizite, meaning there con be other points in the open neighbour Good with the some welle as x This is therefore not a strict local unisian; ze of f. As for 2.4 this sufficient condition is fulfilled and xx is a Itrich local minimizer of

Poblem 2 to lying the Newton direction we singly set the Spiretive of in CP3 d mu(P) = Vfix + Vfix P =0 Volup = - Volu P = - (\frac{1}{2}) - (\frac{1}{2}) In the case that V3/2 = 0, p will not be defined. In the case that to fle to, the New to 9 - 2: rection will be increasing meuning, it's ust a local direction,





a f(x) + (1-2) f(y) = 1 1 x T 6x + 2x T c + (1-4) = y T 6 y + (1-4) y T C che trose the some 1,4 ear tours on the right on haft tool sile the is equality then becomes: 12x 6x + 1 xx 6 (1-d) + 1y 6 dx 2 1 x 16x + (1-2) 1y cy

Problem 3

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$$d(x) = loo(x_0 - x_i^*)^2 + (1 - x_i)^2$$
 $\nabla_{x_1} f = 2 loo(x_0 - x_i) + 2(1 - x_i)(-1)$
 $\nabla_{x_2} f = 2 loo(x_0 - x_i) + 1$
 $\nabla_{x_1} f = 2 loo(x_0 - x_i) + 1$
 $\nabla_{x_1} f = -4 loo(x_0 - x_i) + 1$
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 $\nabla_{x_1} f = -4 loo(x_0 - x_i) + 1$
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