Question 5:

Outputs are :

Yes for different initialization you get different values and there are 2 optimal values

For initialisation [0;0]
x =

-2.2268
1.4578

For Initialization [0;10]

x =

3.1086
1.7937

Code:

```
x = [0;10];
x = [0;0];

for i=1:100
   del = del_f1(x);
   fun = f1(x);
   x_new = x - (inv(del)*fun);
   x = x_new;
End

function y = f1(x)
C = [3;4];
B = [4,3;
   2,1];
A = [1;2];

y = C + B*x - (x*x')*A;

end

function y = del_f1(x)
B = [4,3;
```

```
    2,1];
x1 = x(1);
x2 = x(2);
der = [2*(x1+x2), 2*x1;
       x2, x1+4*x2];
y = B - der;
end
```

Question 7:

Values:

In case a) optimal x is:

```
   3.6000
    1.7000
   -0.2000
   -2.1000
```

In case b) optimal x is

x_2 =

```
   -0.2500
    0.1250
    0.5000
    0.8750
```

Code:

```
A_eq = [1,1,1,1];
B_eq = 3;
A_in = [
    1,2,3,4;
    5,6,7,8;
    ];
B_in = [5;10];
H =  2*eye(4);
f = [0;0;0;0];
x_1 = quadprog(H,f,A_in,B_in,A_eq,B_eq);
```

```
%%
Q = [
    4,1,0,0;
    1,2,1,0;
    0,1,6,0;
    0,0,1,8
    ];
f = [0;0;0;0];
A_in = [
    1,2,3,4;
    5,6,7,8;
    ];
x0 = [1;2;3;4];
B_in = [5;10] + A_in*x0;
x_2 = quadprog(H,f,A_in,B_in)+x0;
```

Question 8:
Output:

Optimal values for 1-norm:
X = [
1.61702127659574
0.978723404255319
]
For Infinity-norm:

X = [
1.41791044776119
1.01492537313433

]

Code:

```
A = [
    2,1;
    -3,7;
    5,4;
    ];
b = [3;2;12];
f = [0,0,1,1,1];
A_in = [
    A, -eye(3);
    -A, -eye(3);
```

```
    ];
B_in = [
    b;
    -b;
    ];
x_1 = linprog(f,A_in,B_in);

A = [
    2,1;
    -3,7;
    5,4;
    ];
b = [3;2;12];
f = [0,0,1];
A_in = [
    A, -ones(3,1);
    -A, -ones(3,1);
    ];
B_in = [
    b;
    -b;
    ];
x_2 = linprog(f,A_in,B_in);
```