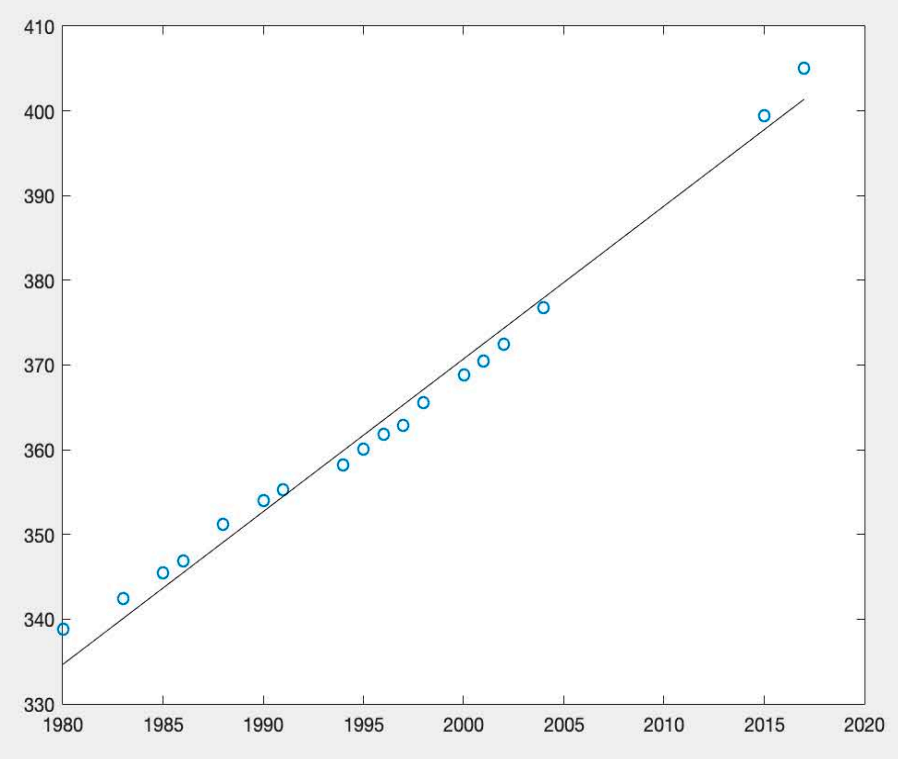
```
% MAT 343
% RAGHAV AGGARWAL
% 1215935292
```

QUESTION 1

PART (A)

```
format short e
dat = load('/Users/raghav.agg15gmail.com/Desktop/gco2.dat');
year = dat(:,1);
conc = dat(:,2);
x=year;
y=conc;
X=[ones(size(x)),x];
z = X' * y ;
S = X' * X ;
U = chol ( S ) ;
w = U' \ z;
c = U\w
plot (x ,y ,'o')
q = year;
fit = c (1) + c (2) * q ;
hold on
plot (q , fit ,'k') ;

% PART (B)
x=year;
y=conc;
X=[ones(size(x)),x.^2];
z = X' * y ;
S = X' * X ;
U = chol ( S ) ;
w = U' \ z;
c = U \ w
q = year;
fit = c(1)+q.*c(2) + q.^2.*c(3);
plot(q,fit,'r'),hold off
legend('data points', 'linear fit', 'quadratic fit', 'location'
 ,'northwest')
```

```
c1=

  -3.2366e+03
   1.8037e+00


c2=

  -1.4337e+03
   4.5110e-04
```



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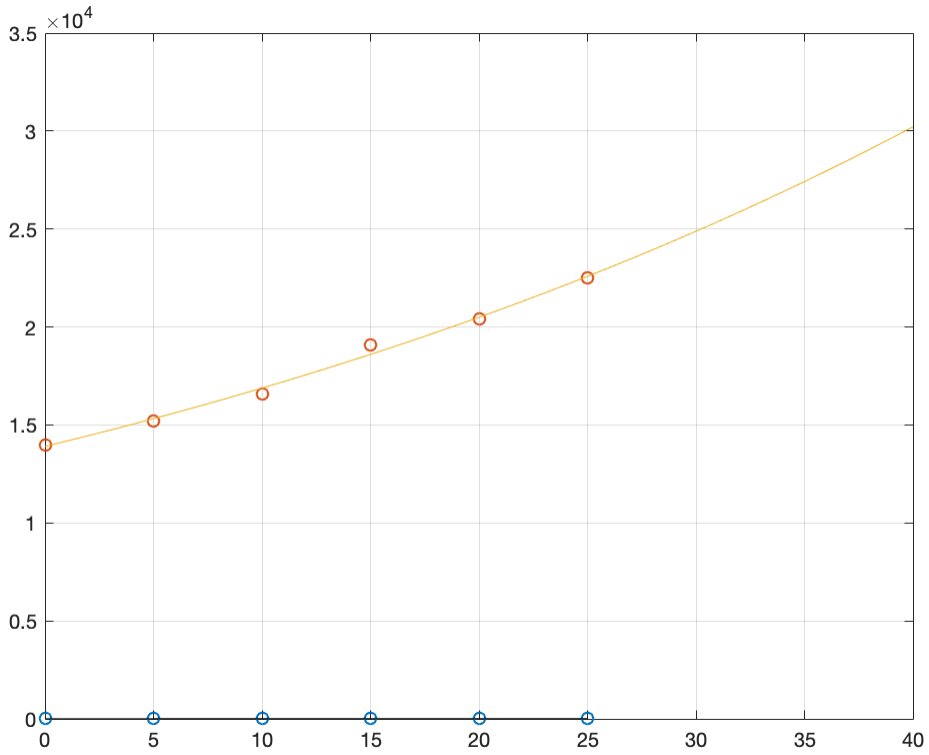
QUESTION 2

PART (A)

```
t = 0:5:25;
y = [14,15.2,16.6,19.1,20.4,22.5]*1000;
t = t';
y = y';
Y = log(y);
X=[ones(size(t)),t];
z = X' * Y ;
S = X' * X ;
U = chol ( S ) ;
w = U' \ z;
c = U \ w
q = t;
plot (q , Y ,'o') ;
fit = c(1)+q.*c(2);
hold on
plot (q , fit ,'k') ;
a = exp(c(1))
b = (c(2))

q = 0:1:40;
eFit = a*exp(b*q);
plot(t,y,'o',q,eFit);
grid on
hold off
```

```
c =

   9.5400e+00
   1.9402e-02


a =

   1.3905e+04


b =

   1.9402e-02
```



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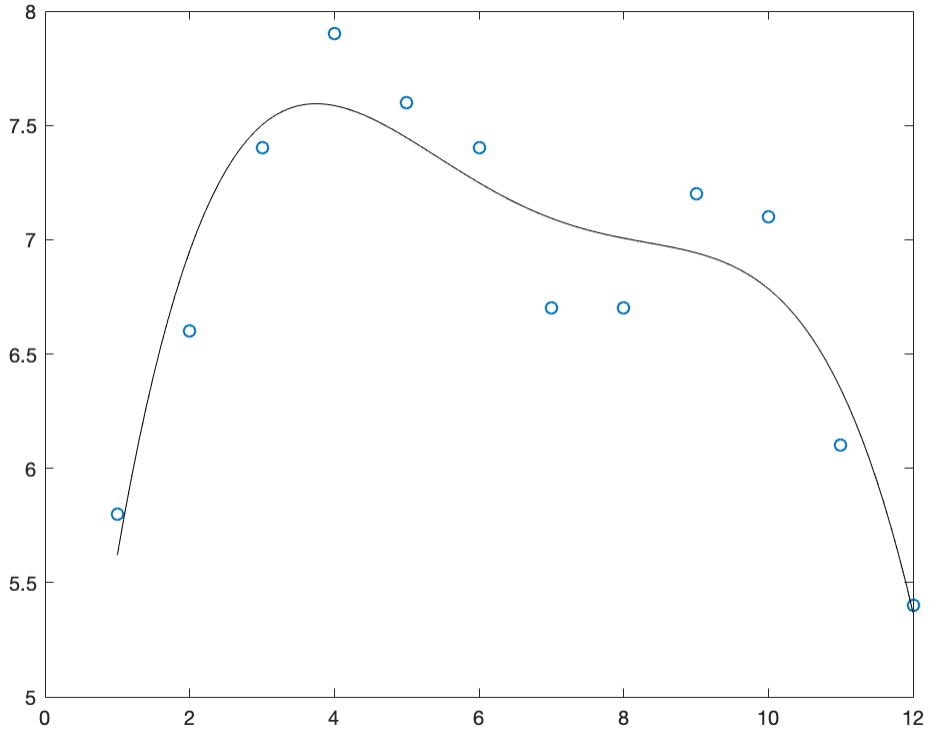
c) Will reach $30,000 dollars at 2.5x10^4

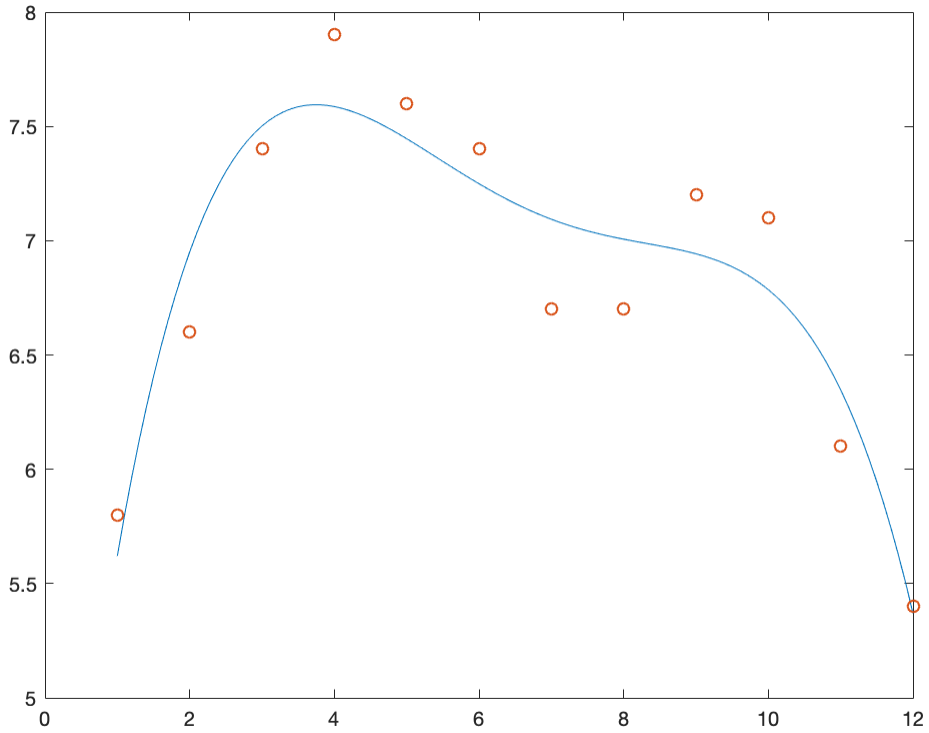
QUESTION 3

PART (A)

```
m = 1:1:12;
Y = [5.8,6.6,7.4,7.9,7.6,7.4,6.7,6.7,7.2,7.1,6.1,5.4];

m = m';
Y = Y';
X=[ones(size(m)),m,m.^2,m.^3,m.^4];
z = X' * Y ;
S = X' * X ;
U = chol ( S ) ;
w = U' \ z;
c = U \ w
plot (m , Y ,'o') ;
hold on
q = min(m):0.1:max(m);
fit = c(1)+q.*c(2)+q.^2*c(3)+q.^3*c(4)+q.^4*c(5);
plot (q , fit ,'k') ;

% PART (B)

c = X \ Y
c = c ([5: -1:1]) ;
q = 1:0.1:12;
z = polyval (c , q ) ;
figure
plot (q ,z ,m ,Y ,'o') ;
hold off
```

```
c =

   3.1290e+00
   3.2185e+00
  -8.0556e-01
   8.1783e-02
  -2.9757e-03


c =

   3.1290e+00
   3.2185e+00
  -8.0556e-01
   8.1783e-02
  -2.9757e-03
```


8
7.5
7
6.5
6
5.5
5
0
2
4
6
8
10
12


8
7.5
7
6.5
6
5.5
5
0
2
4
6
8
10
12

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How do the values of c compare to the ones you found in part (a)?
The value is entirely different they have more points so it is more precise

How does the plot compare to the one you found in part (a)?
The plot in a was a liner line line whereas in part c it was a curve.