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## Exercise 2

```
clc
close all
clear all

%Set up the appropriate vectors
xi = [20 30 40 50];
y = [8 23 28 34];
x = (xi - 35)./5;

%Set up the equation  $A*x = b$ 
b = y';

A_lin = [ones(4,1) x'];
A_quad = [ones(4,1) x' x'.^2];
A_cube = [ones(4,1) x' x'.^2 x'.^3];

%Solve the normal equation  $A'*A*x = A'*b$ 
coeffs_lin = (A_lin'*A_lin)\(A_lin'*b);
coeffs_quad = (A_quad'*A_quad)\(A_quad'*b);
coeffs_cube = (A_cube'*A_cube)\(A_cube'*b);

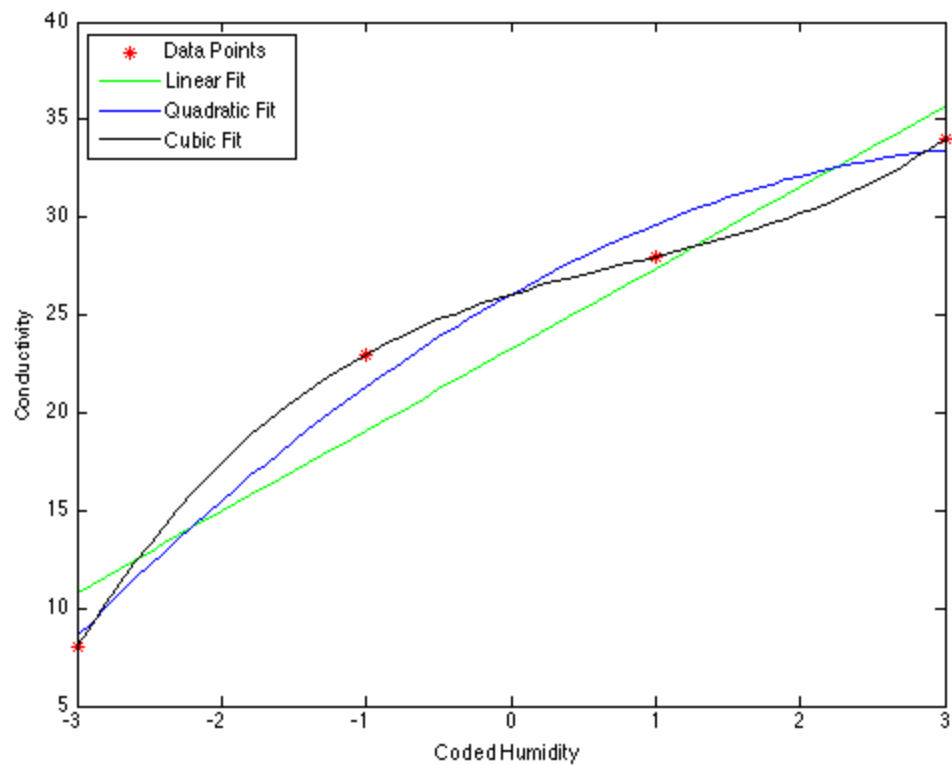
%Set up the plot
figure
plot(x, y, '*r')
xlabel('Coded Humidity')
ylabel('Conductivity')
hold on

%Create a plotting vector with a small step size
xPlot = -3:0.1:3;

%Evaluate all three models at each of the x values
yLinVec = coeffs_lin(1) + coeffs_lin(2)*xPlot;
yQuadVec = coeffs_quad(1) + coeffs_quad(2)*xPlot + coeffs_quad(3)*xPlot.^2;
yCubeVec = coeffs_cube(1) + coeffs_cube(2)*xPlot ...
    + coeffs_cube(3)*xPlot.^2 + coeffs_cube(4)*xPlot.^3;

plot(xPlot, yLinVec, '-g')
plot(xPlot, yQuadVec, '-b')
plot(xPlot, yCubeVec, '-k')

%Add a Legend
%Note: the last parameter sets the position to the top left corner
legend('Data Points', 'Linear Fit', 'Quadratic Fit', 'Cubic Fit', 2)
```



## Exercise 3

```
%Set up the appropriate vectors
clc
clear all

x = [1 3 6];
z = 1./x;
y = [7 3 1];

%Solve the normal equations
b = y';
A_lin = [ones(3,1) z'];
coeffs_lin = (A_lin'*A_lin)\(A_lin'*b);

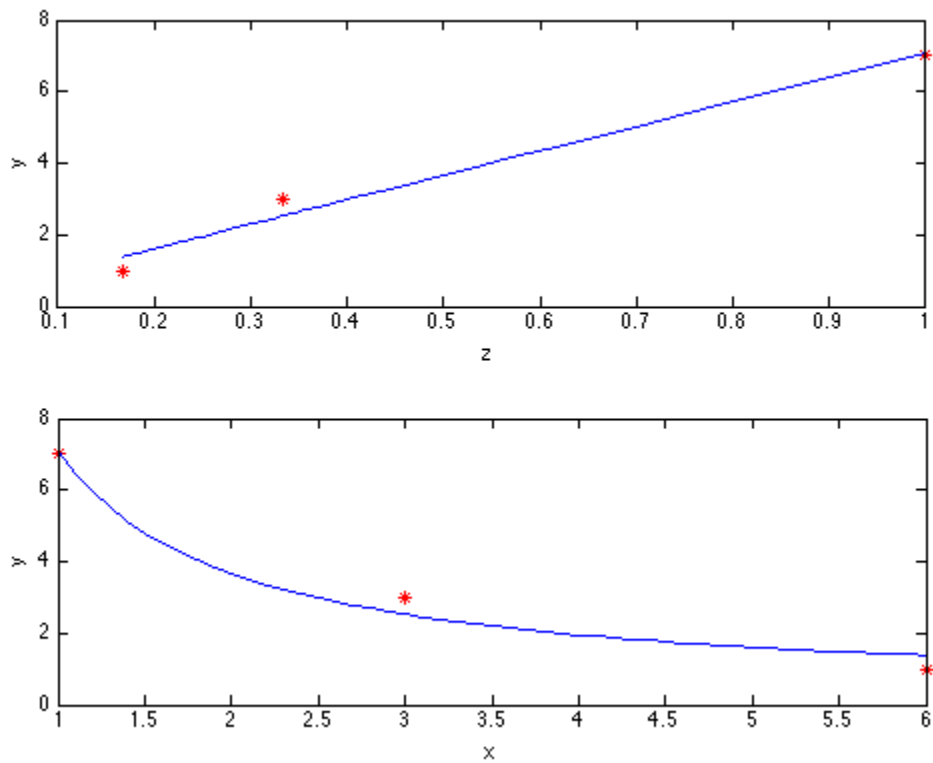
%Set up plotting vectors
xPlot = 1:0.1:6;
zPlot = 1./xPlot;
yPlot = coeffs_lin(1) + coeffs_lin(2)*zPlot;

%Plot y vs x and y vs z on two subplots
figure
subplot(2,1,1)
plot(z, y, 'r*')
hold on
```

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```
plot(zPlot, yPlot)
xlabel('z')
ylabel('y')

subplot(2,1,2)
plot(x, y, 'r*')
hold on
plot(xPlot, yPlot)
xlabel('x')
ylabel('y')
```



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