Wednesday 8 October

Quiz 07   Group Quiz

NAME(s): _____

An engineer working on manufacturing the next mirror for the Hubble Space Telescope made the following measurements of height of the mirror (cm) versus distance from the center of the mirror (cm) along the principle axis. This data set is available in the file **quiz07.dat** in the **get12/matlab** directory.

distance, cm	height, cm
-2.0	7.0000
-1.5	3.9375
-1.0	1.7500
-0.5	0.4375
0.0	0.0000
0.5	0.4375
1.0	1.7500
1.5	3.9375
2.0	7.0000

She needs to determine whether the relation between height and distance is correct, and, if so, the error.

Create a properly labeled plot of the data with a "best-fit" curve. Find the equation of the "best-fit," the total error, and maximum error and location of the maximum error between the data and the "best-fit."

Turn in your plot with the equation, total error, and maximum error and its location. The equation, total error, and maximum error and location may be handwritten on the plot.

```
>> d = [-2 -1.5 -1.0 -0.5 0.0 0.5 1.0 1.5 2.0];
>> h = [7.0 3.9375 1.75 0.4375 0.0 0.4375 1.75 3.9375 7.0];
>>
>> plot(d,h,'r*')
>> xlabel('distance, cm')
>> ylabel('height, cm')
>> title('mirror data: height vs distance')
>>
>> coeff = polyfit(d,h,2)
coeff =
    1.7500    -0.0000     0.0000

>> xfit = linspace(-2,2,200);
>> yfit = polyval(coeff,xfit);
>> hold on
>> plot(xfit,yfit,'b-')

>> error = abs(h - polyval(coeff,d))
error =
  1.0e-014 *
    0.1776     0.1776     0.0666     0.0389     0.0224     0.0167
    0.0222     0.0444     0
```

==> **Max Error = 0 for all x.**