

1.

```
>> A=[1 -2; 1 2; 1 3; 1 5];
>> Aaug = A.'*A;
>> b=[-1; 2.5; 4.5; 6];
>> baug=A.'*b;
>> Asaug=[4 8 12; 8 42 50.5];
>> xApprox=rref(Asaug);
>> xApprox=xApprox(:,3);
```

2.

```
>> bFit=A*xApprox;
>> eSquared=e.*e
```

eSquared =

```
0.0059
0.2500
0.2311
0.0033
```

3.

i.

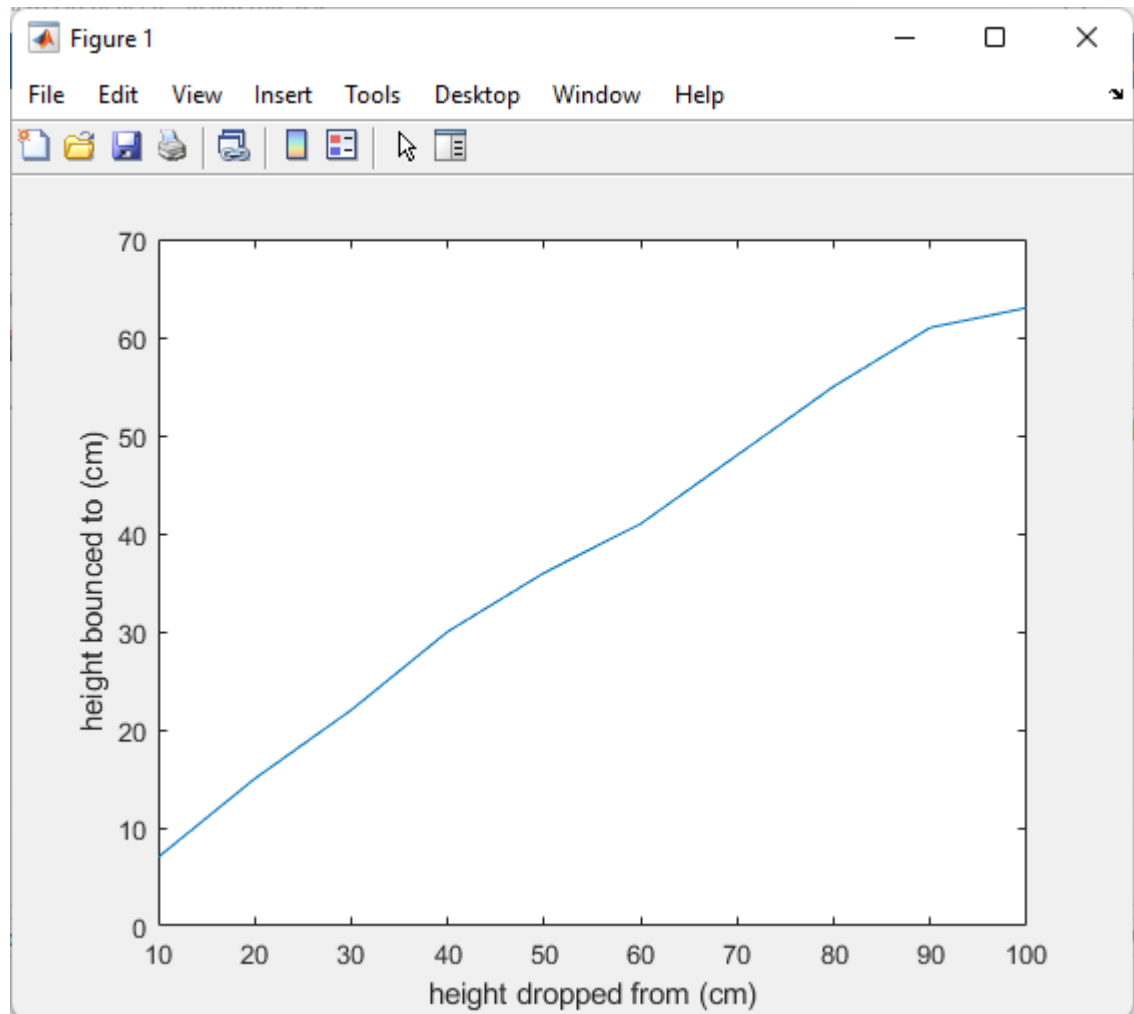
```
>> ballOne=[10 7; 20 15; 30 22; 40 30; 50 36; 60 41; 70 48; 80
55; 90 61; 100 63]
```

ballOne =

```
10    7
20   15
30   22
40   30
50   36
60   41
70   48
80   55
90   61
100  63
```

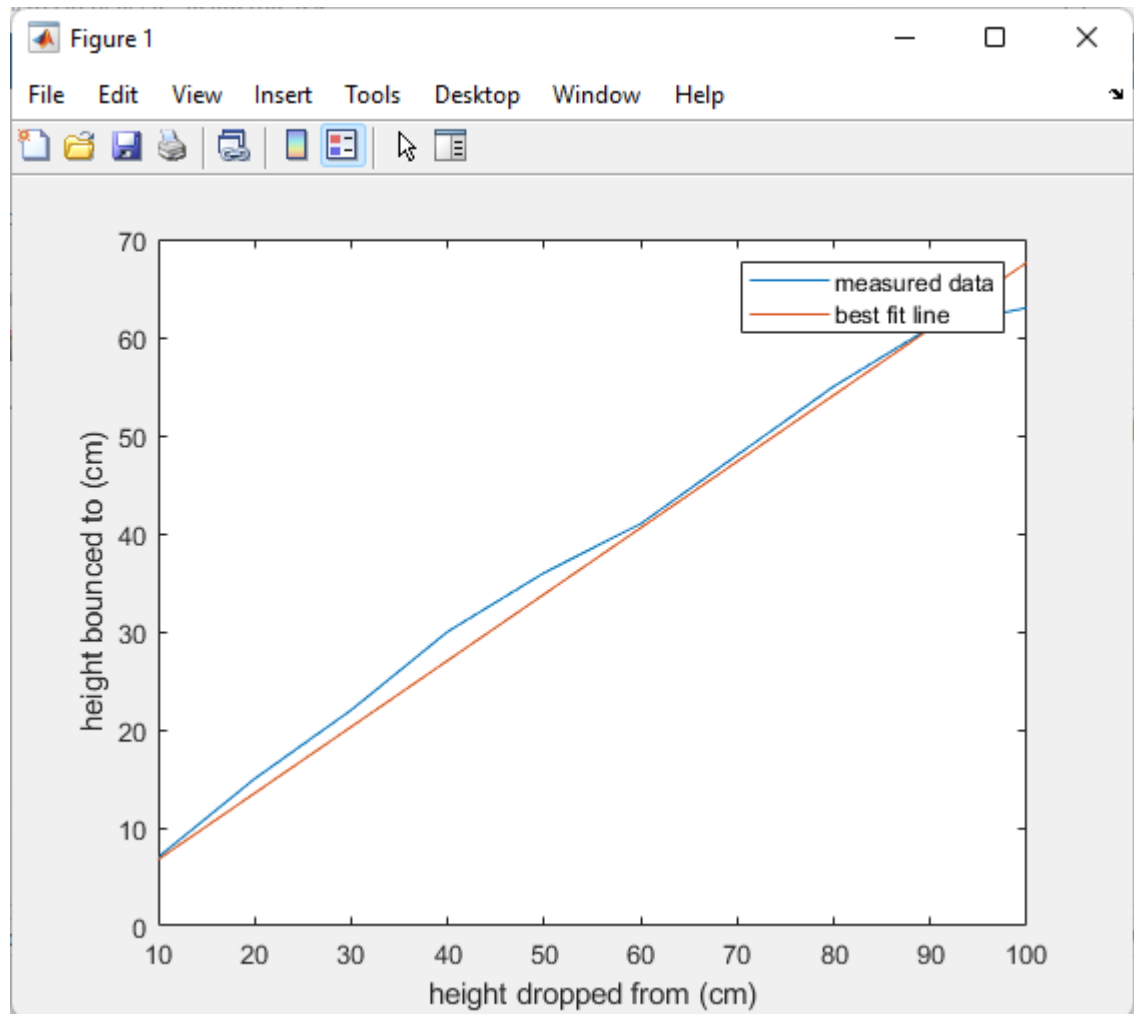
ii.

```
>> plot(ballOne(:,1),ballOne(:,2))
>> xlabel('height dropped from (cm)');
>> ylabel('height bounced to (cm)');
```



iii.

```
>> ballOneDrop=ballOne(:,1);
>> ballOneBounce=ballOne(:,2);
>> ballOneDrop_aug=ballOneDrop.*ballOneDrop;
>> ballOneBounce_aug = ballOneDrop.*ballOneBounce;
>> ballOne_aug = [ballOneDrop_aug ballOneBounce_aug];
>> ballOne_xApprox=rref(ballOne_aug);
>> ballOneBounce_bFit=ballOneDrop*ballOne_xApprox;
>> hold on
>> plot(ballOneBounce_bFit(:,1),ballOneBounce_bFit(:,2))
>> xlabel('height dropped from (cm)');
>> ylabel('height bounced to (cm)');
>> legend('measured data','best fit line');
```



Data matches well

iv.

```
>> ballOne_e = ballOneBounce - ballOneBounce_bFit
```

```
ballOne_e =
```

-3.0000	0.2364
-5.0000	1.4727
-8.0000	1.7091
-10.0000	2.9455
-14.0000	2.1818
-19.0000	0.4182
-22.0000	0.6545
-25.0000	0.8909
-29.0000	0.1273
-37.0000	-4.6364

```
>> ballOne_eSquared = ballOne_e .* ballOne_e
```

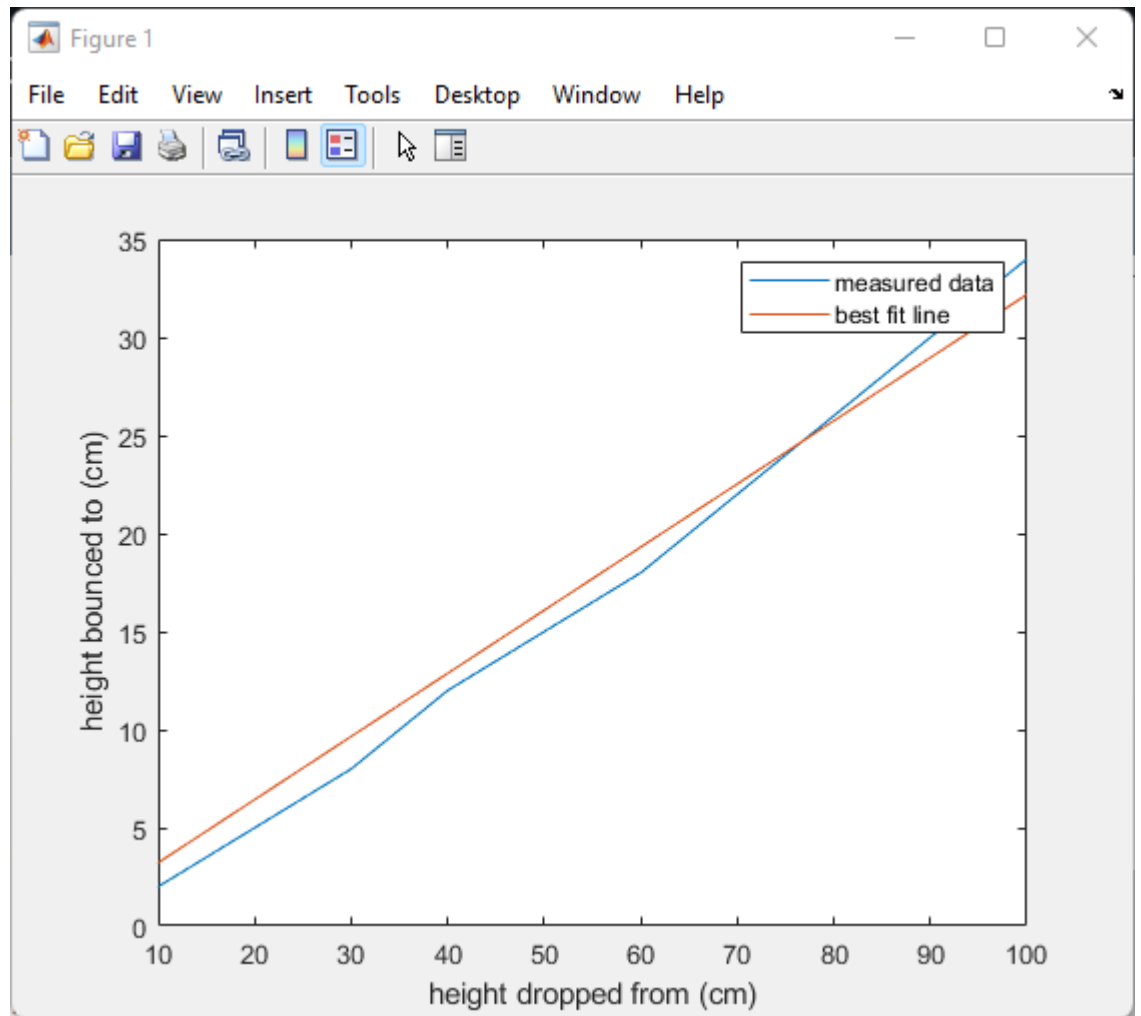
```
ballOne_eSquared =
```

```
1.0e+03 *
```

0.0090	0.0001
0.0250	0.0022
0.0640	0.0029
0.1000	0.0087
0.1960	0.0048
0.3610	0.0002
0.4840	0.0004
0.6250	0.0008
0.8410	0.0000
1.3690	0.0215

v.

```
>> ballTwo=[10 2; 20 5; 30 8; 40 12; 50 15; 60 18; 70 22; 80 26;  
90 30; 100 34];  
>> plot(ballTwo(:,1),ballTwo(:,2))  
>> xlabel('height dropped from (cm)');  
>> ylabel('height bounced to (cm)');  
>> ballTwoDrop=ballTwo(:,1);  
>> ballTwoBounce=ballTwo(:,2);  
>> ballTwoDrop_aug=ballTwoDrop.*ballTwoDrop;  
>> ballTwoBounce_aug=ballTwoDrop.*ballTwoBounce;  
>> ballTwo_aug=[ballTwoDrop_aug ballTwoBounce_aug];  
>> ballTwo_xApprox=rref(ballTwo_aug);  
>> ballTwoBounce_bFit=ballTwoDrop*ballTwo_xApprox;  
>> hold on  
>> plot(ballTwoBounce_bFit(:,1),ballTwoBounce_bFit(:,2))  
>> legend('measured data','best fit line');  
>> ballTwo_e=ballTwoBounce-ballTwoBounce_bFit;  
>> ballTwo_eSquared=ballTwo_e.*ballTwo_e;
```



Yes