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## Section 5.2 Example

```
A = [1 -1 1; 0 0 1; 1 1 1; 4 2 1];
At = A.';
A2 = At*A;
A2I = inv(A2);
Y = [2 0 2 3].';
AtY = At*Y;
res = A2I*AtY;
```

## Problem 5.3

part a

```
A = [1 -1 1; 0 0 1; 1 1 1; 9 3 1];
At = A.';
A2 = At*A;
A2I = inv(A2);
Y = [3 1 2 9].';
AtY = At*Y;
res = A2I*AtY
% part b
figure(1)
x=-4:0.1:4;
y=res(1)*x.^2+res(2)*x+res(3);
plot(x,y)
hold on
x1 =[-1 0 1 3];
plot(x1, Y, 'o')
% part c
syms s
eqn = 1.0455*s^2 -0.5545*s + 1.2909 == 10.0;
vpasolve(eqn)
```

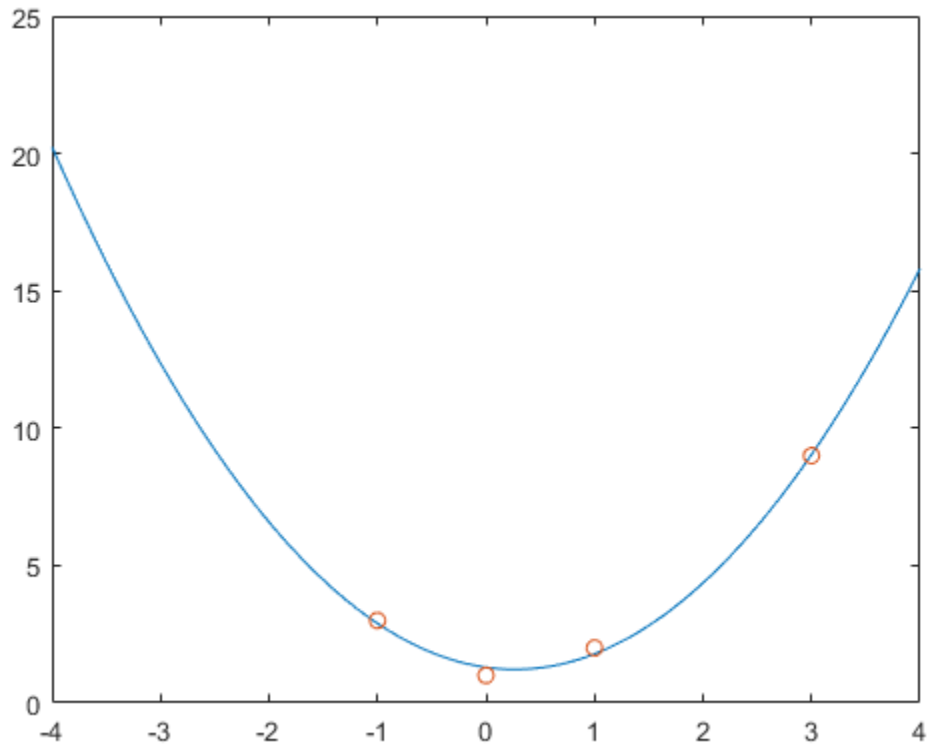
res =

```
1.0455
-0.5545
1.2909
```

ans =

---

-2.6331609087222303881133976046025  
3.1635291535811495655404659929334



## Problem 5.4

part a

```
A = [exp(-2) 1; 1 1; exp(4) 1];  
At = A.';  
A2 = At*A;  
A2I = inv(A2);  
Y = [0 3 4].';  
AtY = At*Y;  
res = A2I*AtY  
% part b  
figure(2)  
x=-4:0.1:4;  
y=res(1)*exp(x)+res(2);  
plot(x,y)  
hold on  
x1 =[-2 0 4];  
plot(x1, Y, 'o')  
% part c  
syms s  
eqn = res(1)*exp(s) + res(2);
```

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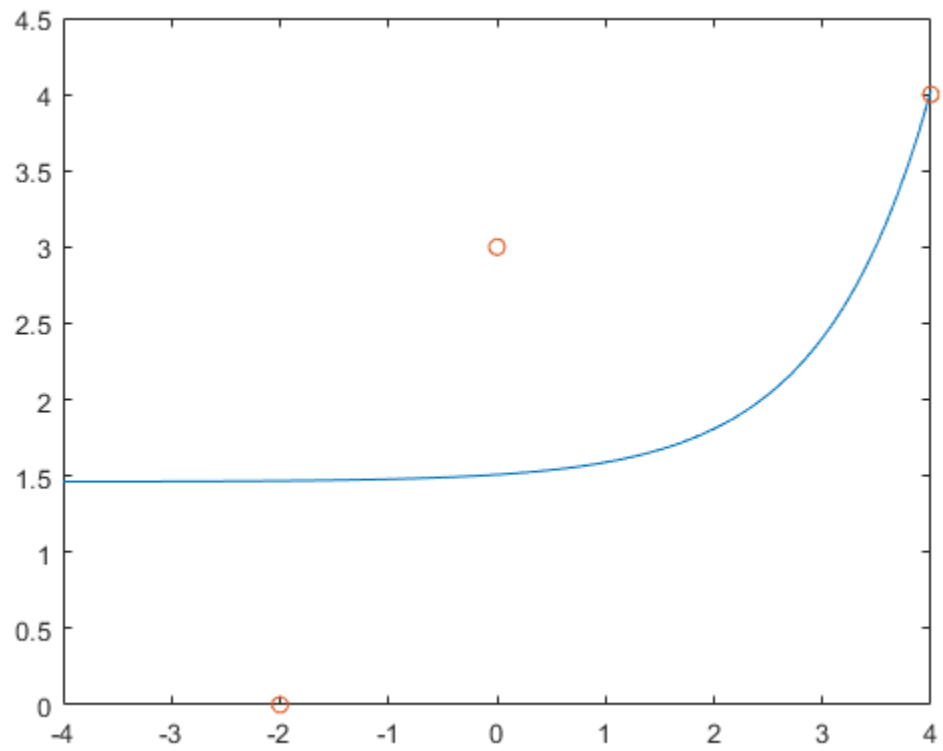
```
diff_eq = diff(eqn);  
vpa(subs(diff_eq, s, 1))
```

```
res =
```

```
0.0469  
1.4615
```

```
ans =
```

```
0.12756241647506181058498678375269
```



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