```
> restart:
> with(linalg):
Warning, the protected names norm and trace have been redefined and
unprotected
```

```
> P:=[[-2,4],[-1,1.1],[0,-0.5],[1,1.0],[2,4.3],[3,8.1]];
```

$$P := [[-2, 4], [-1, 1.1], [0, -.5], [1, 1.0], [2, 4.3], [3, 8.1]]$$

Let's start off by trying a line

These matrices will solve for the linear (ax + b)

```
> A2:=matrix([[-2,1],[-1,1],[0,1],[1,1],[2,1],[3,1]]):
  B2:=transpose(A2): V2:=matrix([[a],[b]]):
  W2:=matrix([[4],[1.1],[-0.5],[1.0],[4.3],[8.1]]):
```

```
> evalm(A2)*evalm(V2)=evalm(W2);
```

$$\begin{bmatrix} -2 & 1 \\ -1 & 1 \\ 0 & 1 \\ 1 & 1 \\ 2 & 1 \\ 3 & 1 \end{bmatrix} \begin{bmatrix} a \\ b \end{bmatrix} = \begin{bmatrix} 4 \\ 1.1 \\ -.5 \\ 1.0 \\ 4.3 \\ 8.1 \end{bmatrix}$$

```
> evalm(B2) * evalm(A2) * evalm(V2) = evalm(B2) * evalm(W2);
```

$$\begin{bmatrix} -2 & -1 & 0 & 1 & 2 & 3 \\ 1 & 1 & 1 & 1 & 1 & 1 \end{bmatrix} \begin{bmatrix} -2 & 1 \\ -1 & 1 \\ 0 & 1 \\ 1 & 1 \\ 2 & 1 \\ 3 & 1 \end{bmatrix} \begin{bmatrix} a \\ b \end{bmatrix} = \begin{bmatrix} -2 & -1 & 0 & 1 & 2 & 3 \\ 1 & 1 & 1 & 1 & 1 & 1 \end{bmatrix} \begin{bmatrix} 4 \\ 1.1 \\ -.5 \\ 1.0 \\ 4.3 \\ 8.1 \end{bmatrix}$$

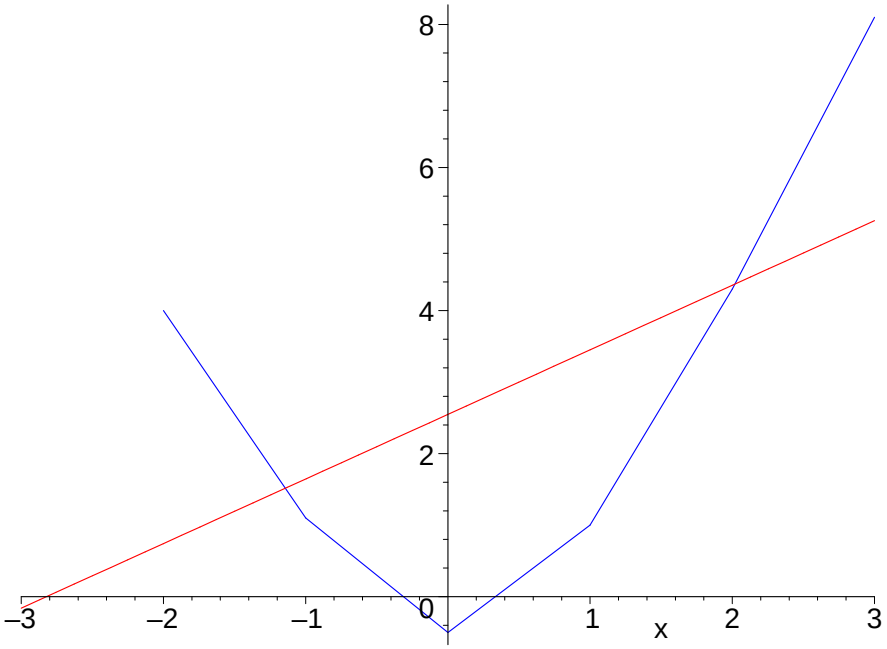
```
> evalm(B2&*A2)*evalm(V2) = evalm(B2&*W2);
```

$$\begin{bmatrix} 19 & 3 \\ 3 & 6 \end{bmatrix} \begin{bmatrix} a \\ b \end{bmatrix} = \begin{bmatrix} 24.8 \\ 18.0 \end{bmatrix}$$

```
> solve({19*a + 3*b = 24.8, 3*a + 6*b = 18.0},{a,b});
```

$$\{a = .9028571429, b = 2.548571429\}$$

```
> plot({P,0.9028*x+2.548}, x=-3..3, color=[red, blue]);
```



This doesn’t fit too well...let’s try a quadratic

These matrices will solve for the quadratic (ax2 + bx + c)

```
> A3:=matrix([[4,-2,1],[1,-1,1],[0,0,1],[1,1,1],[4,2,1],[9,3,1]
  ]): B3:=transpose(A3); V3:=matrix([[a],[b],[c]]):
  W3:=matrix([[4],[1.1],[-0.5],[1.0],[4.3],[8.1]]):
```

$$B3 := \text{transpose}(A3)$$

```
> evalm(A3)*evalm(V3)=evalm(W3);
```

$$\begin{bmatrix} 4 & -2 & 1 \\ 1 & -1 & 1 \\ 0 & 0 & 1 \\ 1 & 1 & 1 \\ 4 & 2 & 1 \\ 9 & 3 & 1 \end{bmatrix} \begin{bmatrix} a \\ b \\ c \end{bmatrix} = \begin{bmatrix} 4 \\ 1.1 \\ -.5 \\ 1.0 \\ 4.3 \\ 8.1 \end{bmatrix}$$

```
> evalm(B3) * evalm(A3) * evalm(V3) = evalm(B3) * evalm(W3);
```

$$\begin{bmatrix} 4 & 1 & 0 & 1 & 4 & 9 \\ -2 & -1 & 0 & 1 & 2 & 3 \\ 1 & 1 & 1 & 1 & 1 & 1 \end{bmatrix} \begin{bmatrix} 4 & -2 & 1 \\ 1 & -1 & 1 \\ 0 & 0 & 1 \\ 1 & 1 & 1 \\ 4 & 2 & 1 \\ 9 & 3 & 1 \end{bmatrix} \begin{bmatrix} a \\ b \\ c \end{bmatrix} = \begin{bmatrix} 4 & 1 & 0 & 1 & 4 & 9 \\ -2 & -1 & 0 & 1 & 2 & 3 \\ 1 & 1 & 1 & 1 & 1 & 1 \end{bmatrix} \begin{bmatrix} 4 \\ 1.1 \\ -.5 \\ 1.0 \\ 4.3 \\ 8.1 \end{bmatrix}$$

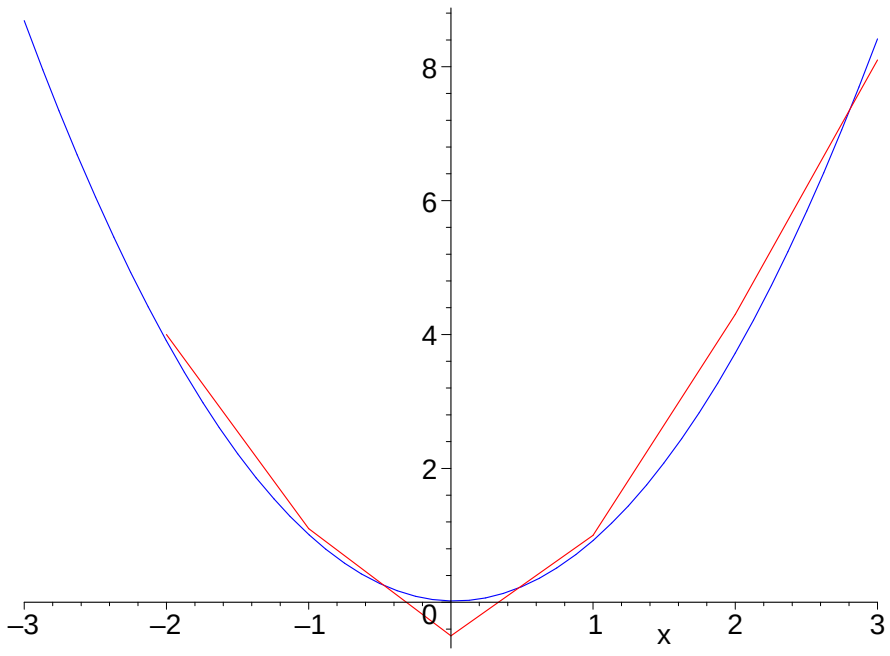
```
> evalm(B3&*A3)*evalm(V3) = evalm(B3&*W3);
```

$$\begin{bmatrix} 115 & 27 & 19 \\ 27 & 19 & 3 \\ 19 & 3 & 6 \end{bmatrix} \begin{bmatrix} a \\ b \\ c \end{bmatrix} = \begin{bmatrix} 108.2 \\ 24.8 \\ 18.0 \end{bmatrix}$$

```
> solve({115*a + 27*b + 19*c = 108.2, 27*a + 19*b + 3*c = 24.8,
  19*a + 3*b + 6*c = 18.0},{a,b,c});
```

$$\{c = .02000000000,\ b = -.04535714286,\ a = .9482142857\}$$

```
> plot({P,0.948*x^2 - 0.0454*x + 0.02}, x=-3..3,
  color=[red,blue]);
```




```
>
```