Solution to Problem Set 6, Problem 8

```
> PLOT(TITLE("log r versus log T"), AXESSTYLE(DEFAULT),
  SYMBOL(CIRCLE),
  POINTS([1.778,1.954],[2.041,2.352],[2.176,2.562],[2.362,2.839],[2.
  892,3.636],[3.155,4.031],[3.458,4.486]));
```

```
> with(linalg):
```

We want to find V such that M*MV = MY, with M* the transpose of M and V the vector <a b>.

```
> M:=matrix([[1.778,1],[2.041,1],[2.176,1],[2.362,1],[2.892,1],[3.15
  5,1],[3.458,1]]);
```

$$M := \begin{bmatrix} 1.778 & 1 \\ 2.041 & 1 \\ 2.176 & 1 \\ 2.362 & 1 \\ 2.892 & 1 \\ 3.155 & 1 \\ 3.458 & 1 \end{bmatrix}$$

```
> MT:=transpose(M);
```

$$MT := \begin{bmatrix} 1.778 & 2.041 & 2.176 & 2.362 & 2.892 & 3.155 & 3.458 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 \end{bmatrix}$$

```
> V:=matrix([[m],[b]]);
```

$$V := \begin{bmatrix} m \\ b \end{bmatrix}$$

```
> Y:=matrix([[1.954],[2.352],[2.562],[2.838],[3.636],[4.031],[4.486]
  ]);
```

$$Y := \begin{bmatrix} 1.954 \\ 2.352 \\ 2.562 \\ 2.838 \\ 3.636 \\ 4.031 \\ 4.486 \end{bmatrix}$$

```
> evalm(MT)*evalm(M)*evalm(V) = evalm(M)*evalm(Y);
```

$$\begin{bmatrix} 1.778 & 2.041 & 2.176 & 2.362 & 2.892 & 3.155 & 3.458 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 \end{bmatrix} \begin{bmatrix} 1.778 & 1 \\ 2.041 & 1 \\ 2.176 & 1 \\ 2.362 & 1 \\ 2.892 & 1 \\ 3.155 & 1 \\ 3.458 & 1 \end{bmatrix} \begin{bmatrix} m \\ b \end{bmatrix} =$$

$$\begin{bmatrix} 1.778 & 1 \\ 2.041 & 1 \\ 2.176 & 1 \\ 2.362 & 1 \\ 2.892 & 1 \\ 3.155 & 1 \\ 3.458 & 1 \end{bmatrix} [1.954 \quad 2.352 \quad 2.562 \quad 2.838 \quad 3.636 \quad 4.031 \quad 4.486]$$

```
> evalm(MT&*M) * evalm(V) = evalm(MT&*Y);
```

$$\begin{bmatrix} 47.916438 & 17.862 \\ 17.862 & 7 \end{bmatrix} \begin{bmatrix} m \\ b \end{bmatrix} = \begin{bmatrix} 59.298617 \\ 21.859 \end{bmatrix}$$

```
> linsolve(evalm(MT&*M),evalm(MT&*Y));
```

$$\begin{bmatrix} 1.506039347 \\ -.7202678298 \end{bmatrix}$$

The slope, therefore: m = 1.507 and the y-intercept: b = -0.720. Thus y = 1.506x - 0.720

```
>
```