# RowReduction

This is problem 2b in section 1.4.

```
A=matrix(QQ,[[3,-7,4],[1,-2,1],[2,-1,-2]])
```

```
A
```

$$\begin{pmatrix} 3 & -7 & 4 \\ 1 & -2 & 1 \\ 2 & -1 & -2 \end{pmatrix}$$

```
b=matrix(QQ,[[10],[3],[6]])
```

```
b
```

$$\begin{pmatrix} 10 \\ 3 \\ 6 \end{pmatrix}$$

```
C=A.augment(b)
```

```
C
```

$$\begin{pmatrix} 3 & -7 & 4 & 10 \\ 1 & -2 & 1 & 3 \\ 2 & -1 & -2 & 6 \end{pmatrix}$$

```
C.swap_rows(0,1)
```

```
C
```

$$\begin{pmatrix} 1 & -2 & 1 & 3 \\ 3 & -7 & 4 & 10 \\ 2 & -1 & -2 & 6 \end{pmatrix}$$

```
C.add_multiple_of_row(1,0,-3)
```

```
C
```

$$\begin{pmatrix} 1 & -2 & 1 & 3 \\ 0 & -1 & 1 & 1 \\ 2 & -1 & -2 & 6 \end{pmatrix}$$

```
C.add_multiple_of_row(2,0,-2)
```

```
C
```

$$\begin{pmatrix} 1 & -2 & 1 & 3 \\ 0 & -1 & 1 & 1 \\ 0 & 3 & -4 & 0 \end{pmatrix}$$

```
C.rescale_row(1,-1)
```

```
C
```

$$\begin{pmatrix} 1 & -2 & 1 & 3 \\ 0 & 1 & -1 & -1 \\ 0 & 3 & -4 & 0 \end{pmatrix}$$

```
C.add_multiple_of_row(0,1,2)
```

```
C
```

$$\begin{pmatrix} 1 & 0 & -1 & 1 \\ 0 & 1 & -1 & -1 \\ 0 & 3 & -4 & 0 \end{pmatrix}$$

```
C.add_multiple_of_row(2,1,-3)
```

```
C
```

$$\begin{pmatrix} 1 & 0 & -1 & 1 \\ 0 & 1 & -1 & -1 \\ 0 & 0 & -1 & 3 \end{pmatrix}$$

```
C.rescale_row(2,-1)
```

```
C
```

$$\begin{pmatrix} 1 & 0 & -1 & 1 \\ 0 & 1 & -1 & -1 \\ 0 & 0 & 1 & -3 \end{pmatrix}$$

```
C.add_multiple_of_row(0,2,1)
```

```
C
```

$$\begin{pmatrix} 1 & 0 & 0 & -2 \\ 0 & 1 & -1 & -1 \\ 0 & 0 & 1 & -3 \end{pmatrix}$$

```
C.add_multiple_of_row(1,2,1)
```

```
C
```

$$\begin{pmatrix} 1 & 0 & 0 & -2 \\ 0 & 1 & 0 & -4 \\ 0 & 0 & 1 & -3 \end{pmatrix}$$