Include Linear Algebra package

> with(linalg):

> Digits := 10;

$$Digits := 10$$

Set up test matrix ...

```
> A := matrix(3,3,
       [ [ 1.23,  0.24, -0.45] ,
         [-0.43,  2.45,  0.78] ,
         [ 0.51, -0.68,  3.23] ] );
```

$$A := \begin{bmatrix} 1.23 & .24 & -.45 \\ -.43 & 2.45 & .78 \\ .51 & -.68 & 3.23 \end{bmatrix}$$

... and right-hand-side

> b := vector([6.78,-3.45,1.67]);

$$b := [\,6.78 \quad -3.45 \quad 1.67\,]$$

Solve the system ...

> x := linsolve(A,b);

$$x := [\,5.426364413 \quad -.3257753771 \quad -.4083508069\,]$$

... and check that the solution satisfies the original equations

> bcheck := multiply(A,x);

$$bcheck := [\,6.780000001 \quad -3.450000001 \quad 1.670000001\,]$$

> add(b,bcheck,1.0,-1.0);

$$[\,-.1\ 10^{-8} \quad .1\ 10^{-8} \quad -.1\ 10^{-8}\,]$$

Repeat the calculation using higher numerical precision ...

> Digits := 18;

$$Digits := 18$$

> x := linsolve(A,b);

$$x := [\,5.4263644124316393 2 \quad -.3257753768173936 25$$
$$-.4083508069894624 50\,]$$

> bcheck := multiply(A,x);

$$bcheck := [\,6.7799999999999999 \quad -3.4500000000000000 \quad 1.6700000000000001\,]$$

> add(b,bcheck,1.0,-1.0);

$$[\,.1\ 10^{-16} \quad 0 \quad -.1\ 10^{-16}\,]$$