

My Version of Prob 6 m Set 4.

This shows how to
avoid fractions.

Solve

$$\begin{cases} 2x - 3y + 3z = 17 \\ -5x - 4y - 6z = -2 \\ -5x + 3y - 4z = -15 \end{cases}$$

Solution:

$$x = -2$$

$$y = -3 \quad \text{or} \quad (x, y, z) = (-2, -3, 4)$$

$$z = 4$$

```
In[1]:= r11 = {2, -3, 3, 17};  
r21 = {-5, -4, -6, -2};  
r31 = {-5, 3, -4, -15};  
MatrixForm[{r11, r21, r31}]
```

```
Out[4]//MatrixForm=  

$$\begin{pmatrix} 2 & -3 & 3 & 17 \\ -5 & -4 & -6 & -2 \\ -5 & 3 & -4 & -15 \end{pmatrix}$$

```

```
In[5]:= r12 = r11; r22 = r21; r32 = r31 - r21;  
MatrixForm[{r12, r22, r32}]
```

```
Out[6]//MatrixForm=  

$$\begin{pmatrix} 2 & -3 & 3 & 17 \\ -5 & -4 & -6 & -2 \\ 0 & 7 & 2 & -13 \end{pmatrix}$$

```

```
In[9]:= r13 = r12; r23 = 2 r22 + 5 r12; r33 = r32;  
MatrixForm[{r13, r23, r33}]
```

```
Out[10]//MatrixForm=  

$$\begin{pmatrix} 2 & -3 & 3 & 17 \\ 0 & -23 & 3 & 81 \\ 0 & 7 & 2 & -13 \end{pmatrix}$$

```

```
In[11]:= r14 = r13; r24 = 7 r23 + 23 r33; r34 = r33;  
MatrixForm[{r14, r24, r34}]
```

```
Out[12]//MatrixForm=  

$$\begin{pmatrix} 2 & -3 & 3 & 17 \\ 0 & 0 & 67 & 268 \\ 0 & 7 & 2 & -13 \end{pmatrix}$$

```

```
In[17]:= r15 = r14; r25 = r34; r35 = 1 / 67 r24;  
MatrixForm[{r15, r25, r35}]
```

```
Out[18]//MatrixForm=  

$$\begin{pmatrix} 2 & -3 & 3 & 17 \\ 0 & 7 & 2 & -13 \\ 0 & 0 & 1 & 4 \end{pmatrix}$$

```

```
In[21]:= r16 = r15; r26 = r25 - 2 r35; r36 = r35;  
MatrixForm[{r16, r26, r36}]
```

```
Out[22]//MatrixForm=  

$$\begin{pmatrix} 2 & -3 & 3 & 17 \\ 0 & 7 & 0 & -21 \\ 0 & 0 & 1 & 4 \end{pmatrix}$$

```

```
In[23]:= r17 = r16; r27 = 1 / 7 r26; r37 = r36;  
MatrixForm[{r17, r27, r37}]
```

```
Out[24]//MatrixForm=  

$$\begin{pmatrix} 2 & -3 & 3 & 17 \\ 0 & 1 & 0 & -3 \\ 0 & 0 & 1 & 4 \end{pmatrix}$$

```

```
In[25]:= r18 = r17 + 3 r27; r28 = r27; r38 = r37;
MatrixForm[{r18, r28, r38}]
```

```
Out[26]//MatrixForm=
```

$$\begin{pmatrix} 2 & 0 & 3 & 8 \\ 0 & 1 & 0 & -3 \\ 0 & 0 & 1 & 4 \end{pmatrix}$$

```
In[27]:= r19 = r18 - 3 r38; r29 = r28; r39 = r38;
MatrixForm[{r19, r29, r39}]
```

```
Out[28]//MatrixForm=
```

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

```
In[29]:= r1 = 1/2 r19; r2 = r29; r3 = r39;
MatrixForm[{r1, r2, r3}]
```

```
Out[30]//MatrixForm=
```

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