GAUSS JORDAN METHOD

Q1: Solve the system of equations using gauss-jordan method.

y+z=2
2x+3z=5
x+y+z=3

```
In[ ]:= a = {{0, 1, 1, 2}, {2, 0, 3, 5}, {1, 1, 1, 3}};
        MatrixForm[a]
```

Out[ ]//MatrixForm=

$$\begin{pmatrix} 0 & 1 & 1 & 2 \\ 2 & 0 & 3 & 5 \\ 1 & 1 & 1 & 3 \end{pmatrix}$$

```
In[ ]:= RowReduce[a] // MatrixForm
```

Out[ ]//MatrixForm=

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

```
In[2]:= Solve[{x == 1, y == 1, z == 1}, {x, y, z}]
Out[2]= {{x → 1, y → 1, z → 1}}
```

Q2: Solve the system of equations using gauss-jordan method.

2x+y+z-2w=-10

4x+2y+w=8

3x+2y+2z=7

x+3y+2z-w=-5

```
In[ ]:= a = {{2, 1, 1, -2, -10}, {4, 0, 2, 1, 8}, {3, 2, 2, 0, 7}, {1, 3, 2, -1, -5}};
        MatrixForm[a]
```

Out[ ]//MatrixForm=

$$\begin{pmatrix} 2 & 1 & 1 & -2 & -10 \\ 4 & 0 & 2 & 1 & 8 \\ 3 & 2 & 2 & 0 & 7 \\ 1 & 3 & 2 & -1 & -5 \end{pmatrix}$$

```
In[ ]:= RowReduce[a] // MatrixForm
```

Out[ ]//MatrixForm=

$$\begin{pmatrix} 1 & 0 & 0 & 0 & 5 \\ 0 & 1 & 0 & 0 & 6 \\ 0 & 0 & 1 & 0 & -10 \\ 0 & 0 & 0 & 1 & 8 \end{pmatrix}$$

```
In[4]:= Solve[{x == 5, y == 6, z == -10, w == 8}, {x, y, z, w}]
Out[4]= {{x → 5, y → 6, z → -10, w → 8}}
```

Q3: Solve the system of equations using gauss-jordan method.

3x+3y+4z=20
2x+y+3z=13
x+y+3z=6

```
In[•]:= a = {{3, 3, 4, 20}, {2, 1, 3, 13}, {1, 1, 3, 6}};
        MatrixForm[a]
```

Out[•]//MatrixForm=

$$\begin{pmatrix} 3 & 3 & 4 & 20 \\ 2 & 1 & 3 & 13 \\ 1 & 1 & 3 & 6 \end{pmatrix}$$

```
In[•]:= RowReduce[a] // MatrixForm
```

Out[•]//MatrixForm=

$$\begin{pmatrix} 1 & 0 & 0 & 7 \\ 0 & 1 & 0 & \frac{1}{5} \\ 0 & 0 & 1 & -\frac{2}{5} \end{pmatrix}$$

```
In[5]:= Solve[{x == 7, y == 1 / 5, z == -2 / 5}, {x, y, z}]
```

Out[5]= $\left\{\left\{x \to 7,\ y \to \frac{1}{5},\ z \to -\frac{2}{5}\right\}\right\}$