```
(*3.1a*)
ClearAll["Global`*"];
x = 0;
y = 0;
z = 0;

x = √72 ;
y = √72 ;
z = 27;

x = - √72 ;
y = - √72 ;
z = 27;

m = Eigenvalues[{{-10, 10, 0}, {28 - z, -1, -x}, {y, x, -8 / 3}}] // MatrixForm;
m // FullSimplify;
```

$$
(*fp1= \begin{pmatrix} \frac{1}{2}\left(-11-\sqrt{1201}\right) \\ \frac{1}{2}\left(-11+\sqrt{1201}\right) \\ -\frac{8}{3} \end{pmatrix}
$$

$$
fp2= \begin{pmatrix} \boxed{\sqrt{}-13.9\ldots} \\ \boxed{\sqrt{}0.0940\ldots+10.2\ldots\ i} \\ \boxed{\sqrt{}0.0940\ldots-10.2\ldots\ i} \end{pmatrix}
$$

$$
fp3= \begin{pmatrix} \boxed{\sqrt{}-13.9\ldots} \\ \boxed{\sqrt{}0.0940\ldots+10.2\ldots\ i} \\ \boxed{\sqrt{}0.0940\ldots-10.2\ldots\ i} \end{pmatrix}
$$

```
 For a fixed point to be stable,
all eigenvalues must be strictly smaller than 0. For all three fixed points
 this is not the case. Thus, there are no fixed points in this system.*)
```

```
(*3.1d*)
ClearAll["Global`*"];
m = Eigenvalues[{{-σ, σ, 0}, {r - z, -1, -x}, {y, x, -b}}] // MatrixForm;
m // FullSimplify
```

Out[ ]//MatrixForm=

$$
\begin{pmatrix} \text{Root}\left[144\,\sigma + 28\,b\,\sigma - b\,r\,\sigma + (72 + b + 28\,\sigma + b\,\sigma - r\,\sigma)\,\#1 + (1 + b + \sigma)\,\#1^2 + \#1^3\ \&,\ 1\right] \\ \text{Root}\left[144\,\sigma + 28\,b\,\sigma - b\,r\,\sigma + (72 + b + 28\,\sigma + b\,\sigma - r\,\sigma)\,\#1 + (1 + b + \sigma)\,\#1^2 + \#1^3\ \&,\ 2\right] \\ \text{Root}\left[144\,\sigma + 28\,b\,\sigma - b\,r\,\sigma + (72 + b + 28\,\sigma + b\,\sigma - r\,\sigma)\,\#1 + (1 + b + \sigma)\,\#1^2 + \#1^3\ \&,\ 3\right] \end{pmatrix}
$$

```
Integrate[]
```