▾ Use sympy to solve the following questions

1. Solve the quadratic function $x^2 + 2x - 8 = 0$

```
from sympy import *
```

2. What is the function f(x) which is equal to its derivative?

3. Compute the area under $f(x) = x^3$ **from x=0 to x=1**

4. Calculate $\displaystyle\sum_{x=0}^{\infty}\left(\frac{1}{x!}\right)$

5. Calculate $\lim_{n\to\infty}\left(1 + \frac{1}{n}\right)^n$

6. flips the matrix through its diagonal $\begin{bmatrix} 2 & -3 & -8 & 7 \\ -2 & -1 & 2 & -7 \\ 1 & 0 & -3 & 6 \end{bmatrix}$

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7. Row operations: We know the following matrix

```
M = eye(3)
M
```

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

Do matrix row operations to R2 ← R2 + 3R1. (update Row 2 to R2+3*R1). Print the matrix

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

8.Find determinant of M

9.Find the following matrix's eigenvalue and eigen vector

```
M = Matrix( [[ 9, -2],
[-2, 6]] )
```

10. Implement the Predator-prey model in python

Suppose fish starts at 10 hundreds, bears starts at 1 hundred

alpha = 1.1

beta = 0.4

delta = 0.1

gamma = 0.4

draw the plots(bear-time, fish-time)

t = np.linspace(0,50,num=1000)

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