Assignment02

March 21, 2019

1. Define a function

   $f(x) = e^x$

2. Define a domain

   $-3 < x < 3

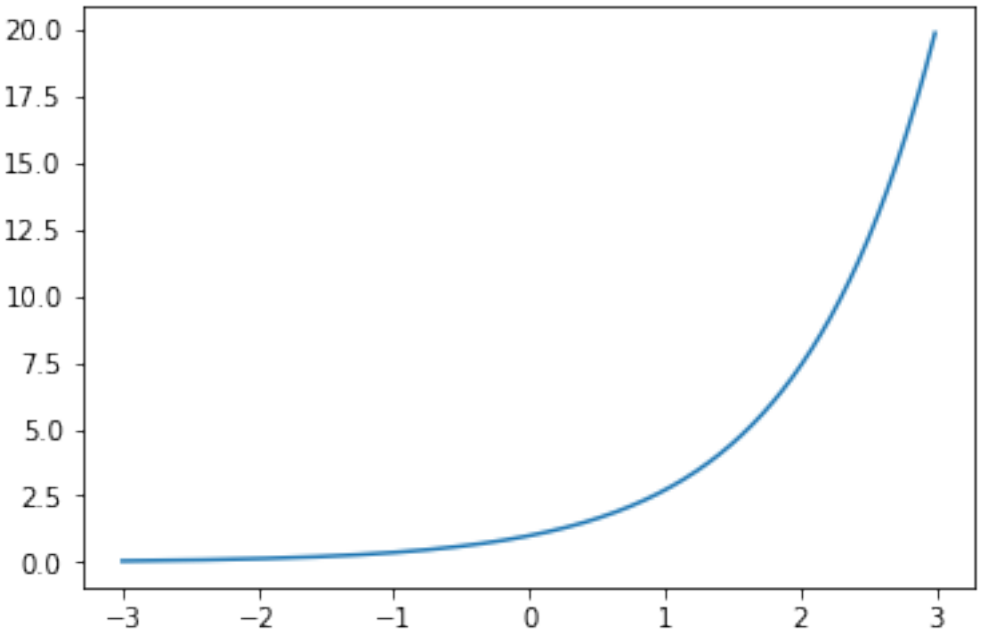
```
In [34]: import matplotlib.pyplot as plt
         import numpy as np

         x = np.arange(-3, 3, 0.01)
         y = np.exp(x)
```

3. Plot the function

```
In [35]: plt.plot(x, y, label = 'f(x)')

Out[35]: [<matplotlib.lines.Line2D at 0x1d231b58860>]
```



4. Select a point

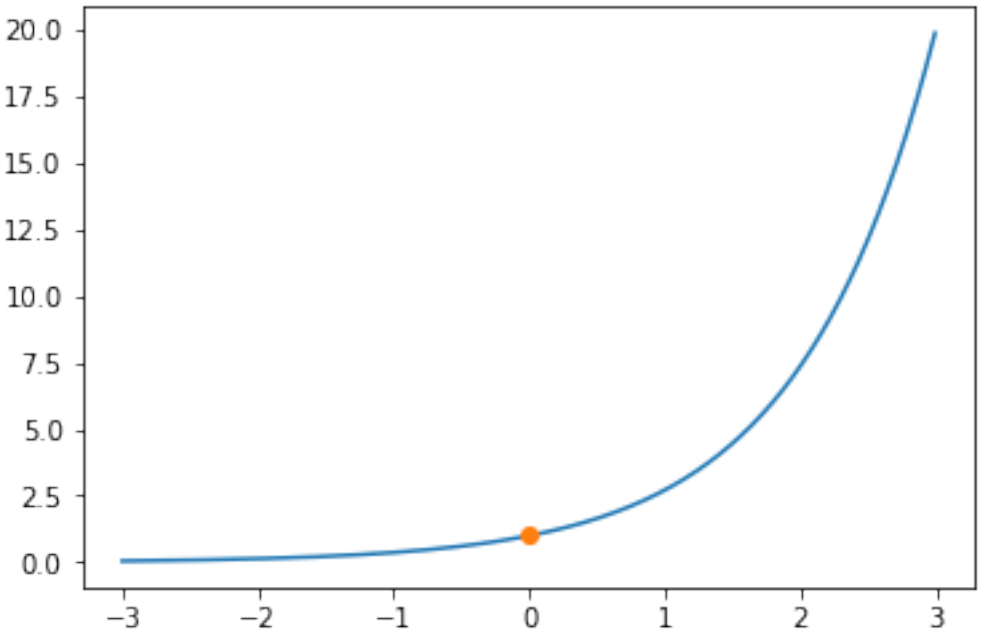
   $ a = 0

```
In [36]: a = 0
```

5. Mark the point

```
In [37]: plt.plot(x, y, label = 'f(x)')
         plt.plot(a, np.exp(a), 'o')
```

```
Out[37]: [<matplotlib.lines.Line2D at 0x1d231e8b5f8>]
```



6. Define the first-order Taylor approximation at the point

   $g(x) = e^0 + e^0(x - 0) = x + 1$

```
In [38]: y2 = np.exp(a) + np.exp(a) * (x - a)
```

7. Plot the Talyor approximation

```
In [39]: plt.plot(x, y, label = 'f(x)')
         plt.plot(a, np.exp(a), 'o')
         plt.plot(x, y2, label = 'g(x)')
```

```
plt.title('Taylor Approximation')
plt.xlabel('x axis')
plt.ylabel('y axis')

plt.legend()
plt.show()
```