In [1]:
```
1 import numpy as np
```

log functions

Natural log >> log to the base e

In [2]:
```
1 np.log(0)
```

```
<ipython-input-2-f6e7c0610b57>:1: RuntimeWarning: divide by zero encountered in log
  np.log(0)
```

Out[2]:
```
-inf
```

In [3]:
```
1 np.log(1)
```

Out[3]:
```
0.0
```

In [4]:
```
1 np.log(np.e)
```

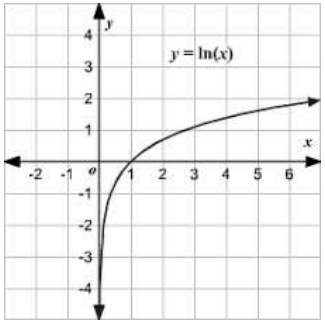
Out[4]:
```
1.0
```

In [9]:
```
1 np.e,np.exp(1)
```

Out[9]:
```
(2.718281828459045, 2.718281828459045)
```

In [10]:
```
1 np.log(10)
```

Out[10]:
```
2.302585092994046
```



log10 (log 10 to the base any number)

In [11]:
```
1 np.log10(0)
```

```
<ipython-input-11-fb8478a94c6a>:1: RuntimeWarning: divide by zero encountered in log10
  np.log10(0)
```

Out[11]:
```
-inf
```

In [12]:
```
1 np.log10(1)
```

Out[12]:
```
0.0
```

In [13]:
```
1 np.log10(10)
```

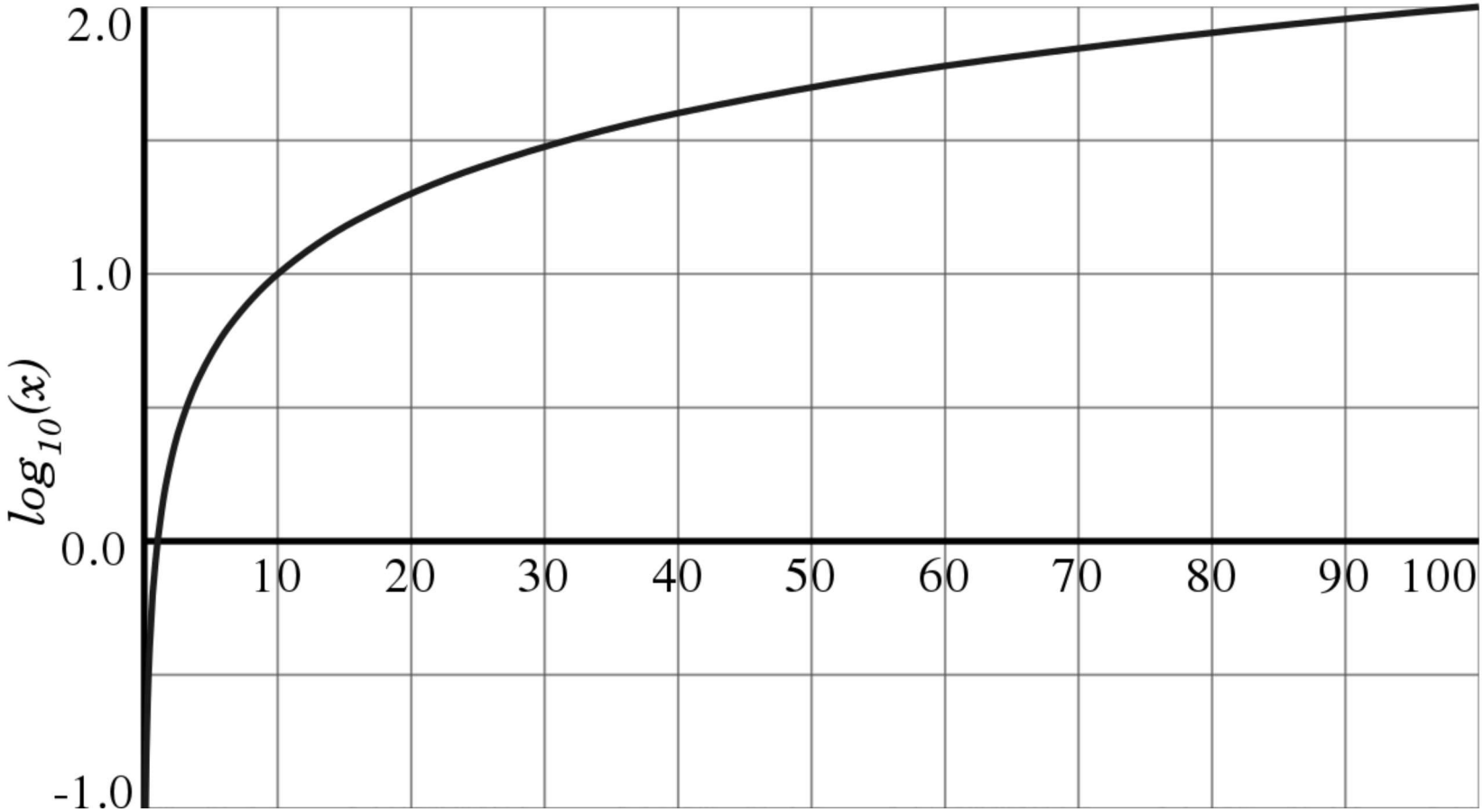
Out[13]:
```
1.0
```

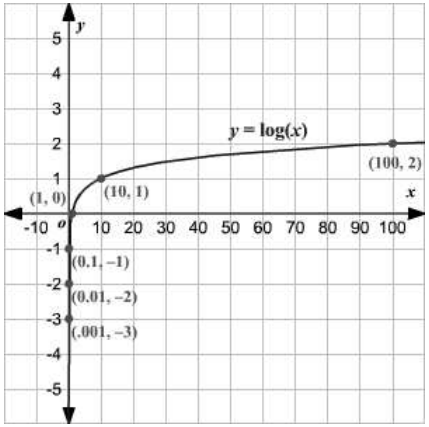
In [15]:
```
1 np.log10(100)
```

Out[15]:
```
2.0
```

In [16]:
```
1 np.log10(1000)
```

Out[16]:
```
3.0
```


2.0
1.0
0.0
-1.0
$log_{10}(x)$
10 20 30 40 50 60 70 80 90 100


y
x
y = log(x)
(1, 0)
(10, 1)
(100, 2)
(0.1, −1)
(0.01, −2)
(.001, −3)

log2 (log 2 to the base any number)

In [17]:
```
1 np.log2(0)
```

```
<ipython-input-17-94b78e711a59>:1: RuntimeWarning: divide by zero encountered in log2
  np.log2(0)
```

Out[17]: -inf

In [18]:
```
1 np.log2(1)
```

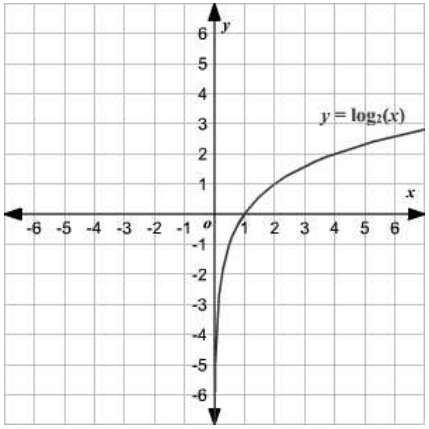
Out[18]: 0.0

In [19]:
```
1 np.log2(2)
```

Out[19]: 1.0

In [21]:
```
1 np.log2(4)
```

Out[21]: 2.0



In [22]:
```
1 np.log2(8)
```

Out[22]: 3.0

In [ ]:
```
1
```