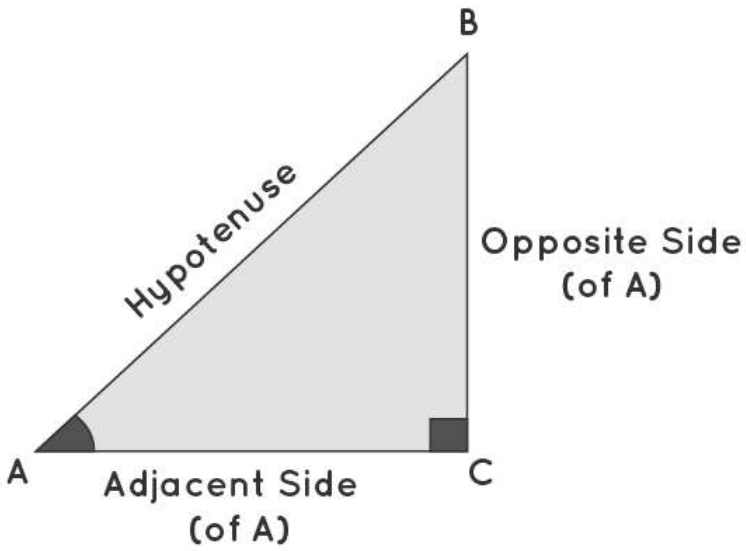
In [1]:
```
1 import numpy as np
```

Sin Cos Tan Formulas

cuemath
THE MATH EXPERT



$$\sin A = \frac{\text{Opposite Side}}{\text{Hypotenuse}}$$

$$\cos A = \frac{\text{Adjacent Side}}{\text{Hypotenuse}}$$

$$\tan A = \frac{\text{Opposite Side}}{\text{Adjacent Side}}$$

Note:

- $\sin A = \frac{1}{\text{cosec } A}$ (or) $\text{cosec } A = \frac{1}{\sin A}$
- $\cos A = \frac{1}{\sec A}$ (or) $\sec A = \frac{1}{\cos A}$

- $\tan A = \frac{1}{\cot A}$ (or) $\cot A = \frac{1}{\tan A}$
- $\tan A = \frac{\sin A}{\cos A}$
- $\cot A = \frac{\cos A}{\sin A}$

```
1 all numpy trignometric function takes in values in radians only
```

Trigonometry Ratio Table								
Angles (In Degrees)	$0°$	$30°$	$45°$	$60°$	$90°$	$180°$	$270°$	$360°$
Angles (In Radians)	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$	2π
sin	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1	0	-1	0
cos	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0	-1	0	1
tan	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	Not Defined	0	Not Defined	1
cot	Not Defined	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	0	Not Defined	0	Not Defined
csc	Not Defined	2	$\sqrt{2}$	$\frac{2}{\sqrt{3}}$	1	Not Defined	-1	Not Defined
sec	1	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	2	Not Defined	-1	Not Defined	1

In [3]:
```
1 np.sin(np.pi/6)
```

Out[3]: 0.49999999999999994

In [4]:
```
1 np.cos(np.pi/4)
```

Out[4]: 0.7071067811865476

In [6]:
```
1/np.sqrt(2)
```

Out[6]: 0.7071067811865475

In [9]:
```
np.tan(np.pi)      << tan(pi) is 0
```

Out[9]: -1.2246467991473532e-16

In [11]:
```
cot_90 = np.tan((np.pi/2))**(-1)
cot_90
```

Out[11]: 6.123233995736766e-17

In [12]:
```
6.123233995736766/10000000000000000
```

Out[12]: 6.123233995736766e-17

In [ ]:
```
0.000000000000000061223
```

In [13]:
```
cot_90 = 1/np.tan((np.pi/2))
cot_90
```

Out[13]: 6.123233995736766e-17

degrees to radians

deg2rad()

In [14]:
```
np.deg2rad(30)
```

Out[14]: 0.5235987755982988

In [15]:
```
np.pi/6       # (22/7)/6
```

Out[15]: 0.5235987755982988

In [22]:
```
np.sin(0.5235987755982988)
```

Out[22]: 0.49999999999999994

In [17]:
```
np.deg2rad(45),np.pi/4
```

Out[17]: (0.7853981633974483, 0.7853981633974483)

radians()

In [19]:
```
np.radians(30)
```

Out[19]: 0.5235987755982988

In [20]:
```
1 np.deg2rad(30)
```

Out[20]: 0.5235987755982988

radians to degree

rad2deg()

In [23]:
```
1 np.rad2deg(np.pi/6)
```

Out[23]: 29.999999999999996

In [24]:
```
1 np.rad2deg(np.pi/4)
```

Out[24]: 45.0

In [25]:
```
1 np.rad2deg(np.pi)
```

Out[25]: 180.0

degrees()

In [26]:
```
1 np.degrees(np.pi/6)
```

Out[26]: 29.999999999999996

In [27]:
```
1 np.degrees(np.pi/4)
```

Out[27]: 45.0

In [28]:
```
1 np.degrees(np.pi/2)
```

Out[28]: 90.0

In [29]:
```
1 np.cos(np.radians(45))
```

Out[29]: 0.7071067811865476

In [30]:
```
1 np.cos(np.pi/4)
```

Out[30]: 0.7071067811865476

In [ ]:
```
1
```