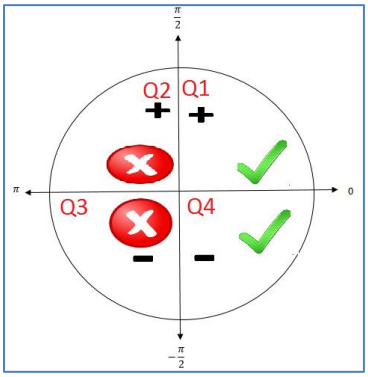
INVERSE TRIGONOMETRIC FUNCTIONS

Inverse Sine Function



	Q1				Q2			Q3			Q4		
θ	0	30	60	90	120	150	180	210	240	270	300	330	360
Sin	0	0.5	0.87	1	0.87	0.5	0	-0.5	-0.87	-1	-0.87	-0.5	0
Cos	1	0.87	0.5	0	-0.5	-0.87	-1	-0.87	-0.5	0	0.5	0.87	1

Question #1

$$\boldsymbol{sin^{-1}\left(\frac{1}{2}\right)} = ?$$

Solution:

$$sin(30) = \frac{1}{2}$$

$$sin(150) = \frac{1}{2}$$

Answer:

$$sin^{-1}\left(\frac{1}{2}\right) = 30^0$$

Because 30^0 lies in Q1 while 150^0 lies in Q2.

Question #2

$$\boldsymbol{sin^{-1}}\left(\frac{\sqrt{\mathbf{3}}}{\mathbf{2}}\right) = ?$$

Solution:

$$sin(60) = \frac{\sqrt{\mathbf{3}}}{\mathbf{2}}$$

$$sin(120) = \frac{\sqrt{\mathbf{3}}}{\mathbf{2}}$$

Answer:

$$sin^{-1}\left(\frac{\sqrt{\mathbf{3}}}{\mathbf{2}}\right) = 60^0$$

Because 60^0 lies in Q1 while 120^0 lies in Q2.

Question #3

$$\boldsymbol{sin^{-1}\left(-\frac{1}{2}\right)} = ?$$

Solution:

$$sin(210) = -\frac{1}{2}$$

$$sin(330) = -\frac{1}{2}$$

$$sin(-30) = -\frac{1}{2}$$

Answer:

$$sin^{-1}\left(-\frac{1}{2}\right) = -30^0$$

- 210^0 lies in Q3 that why this is the correct answer
- 330^0 lies in Q4 however the range of sin is $-\frac{\pi}{2} to \frac{\pi}{2}$. That's why this is not the correct answer.
- -30^0 lies in Q4 and also is in the required range, that's why this is the correct answer.

Question #4

$$\boldsymbol{sin^{-1}}\left(-\frac{\sqrt{\mathbf{2}}}{\mathbf{2}}\right)=?$$

Solution:

$$sin(225)=-\frac{\sqrt{\mathbf{2}}}{\mathbf{2}}$$

$$sin(315)=-\frac{\sqrt{\mathbf{2}}}{\mathbf{2}}$$

$$sin(-45)=-\frac{\sqrt{\mathbf{2}}}{\mathbf{2}}$$

Answer:

$$sin^{-1}\left(-\frac{\sqrt{\mathbf{2}}}{\mathbf{2}}\right)=-45^{0}$$

- 225^0 lies in Q3 that why this is the correct answer
- 315^0 lies in Q4 however the range of sin is $-\frac{\pi}{2} to \frac{\pi}{2}$. That's why this is not the correct answer.
- -45^0 lies in Q4 and also is in the required range, that's why this is the correct answer.

Question #5

$$\boldsymbol{sin^{-1}(0)} = ?$$

Solution:

$$sin(0) = 0$$

$$sin(180) = 0$$

$$sin(360) = 0$$

Answer:

$$sin^{-1}(0) = 0^0$$

- 180^0 lies in Q2 that why this is the correct answer
- 360^0 lies in Q4 however the range of sin is $-\frac{\pi}{2} to \frac{\pi}{2}$. That's why this is not the correct answer.
- 0^0 lies in Q1 and also is in the required range, that's why this is the correct answer.

Question #6

$$\boldsymbol{sin^{-1}(1)} = ?$$

Solution:

$$sin(90) = 1$$

Answer:

$$sin^{-1}(1) = 90^0$$

- Because 0^0 lies in Q1 and also is the required range, that's why this is the correct answer.

Question #7

$$\boldsymbol{sin^{-1}(-1)} = ?$$

Solution:

$$sin(270) = -1$$

$$sin(-90) = -1$$

Answer:

$$sin^{-1}(-1) = -90^0$$

- 270^0 lies in Q3 that why this is the correct answer
- -90^0 lies in the required range, that's why this is the correct answer.

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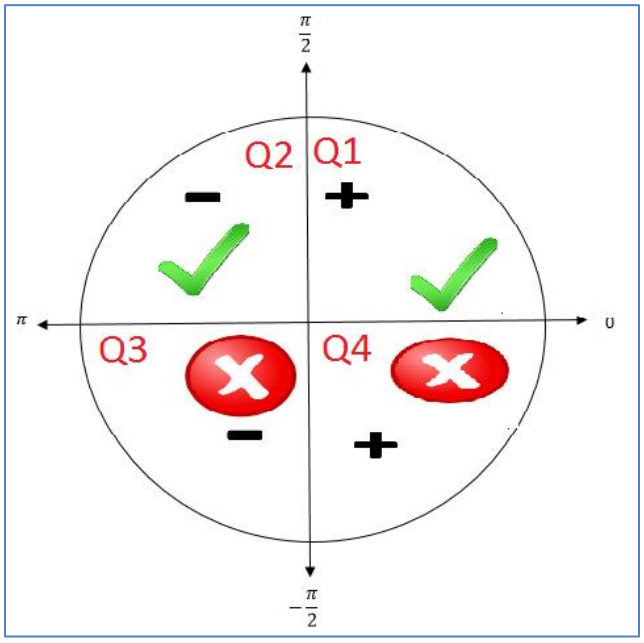

Question #1

$$\boldsymbol{cos^{-1}\left(\frac{1}{2}\right)} = ?$$

Solution:

$$cos(60) = \frac{1}{2}$$

$$cos(300) = \frac{1}{2}$$

Answer:

$$cos^{-1}\left(\frac{1}{2}\right) = 60^0$$

Because 60^0 lies in Q1 while 300^0 lies in Q4.

Question #2

$$\boldsymbol{cos^{-1}\left(\frac{-\sqrt{3}}{2}\right)} =?$$

Solution:

$$cos(150) = \frac{-\sqrt{3}}{2}$$

$$cos(210) = \frac{-\sqrt{3}}{2}$$

Answer:

$$cos^{-1}\left(\frac{-\sqrt{3}}{2}\right) = 150^0$$

Because 150^0 lies in Q2 while 210^0 lies in Q3.

Question #3

$$\boldsymbol{cos^{-1}\left(\frac{-\sqrt{2}}{2}\right)} =?$$

Solution:

$$cos(135) = \frac{-\sqrt{2}}{2}$$

Answer:

$$cos^{-1}\left(\frac{-\sqrt{2}}{2}\right) = 135^0$$

Because 135^0 lies in Q2.

Question #4

$$\boldsymbol{cos^{-1}(0)} = ?$$

Solution:

$$cos(90) = 0$$

$$cos(270) = 0$$

Answer:

$$cos^{-1}(0) = 90^0$$

Because 90^0 lies in Q1 while 270^0 lies in Q3.

Question #5

$$\boldsymbol{cos^{-1}(1)} = ?$$

Solution:

$$cos(0) = 1$$

$$cos(360) = 1$$

Answer:

$$cos^{-1}(10) = 0^0$$

Because 0^0 lies in Q1 while 360^0 lies in Q4.

Question #6

$$\boldsymbol{cos^{-1}(-1)} = ?$$

Solution:

$$cos(180) = -1$$

Answer:

$$cos^{-1}(-1) = 180^0$$

Because 180^0 lies in Q2.