

Solving Basic Trigonometric Equations Practice

From the chart below of possible solutions, place the correct letter in the blank.

<u>Letter</u>	<u>Answer</u>	<u>Letter</u>	<u>Answer</u>	<u>Letter</u>	<u>Answer</u>	<u>Letter</u>	<u>Answer</u>
A	45°	D	101°	G	225°	J	259°
B	60°	E	126°	H	240°	K	300°
C	68°	F	141°	I	248°	L	315°

1. Solve $\sin \theta = -\frac{1}{\sqrt{2}}$, where $0^\circ \leq \theta < 360^\circ$. The correct letter(s) is(are)

_____.

2. Solve $\tan \theta = 2.45$, where $0^\circ \leq \theta < 360^\circ$. The correct letter(s) is(are)

_____.

3. Solve $\sin \theta = 0.6320$, where $90^\circ < \theta < 270^\circ$. The correct letter(s) is(are)

_____.

4. Solve $\cos \theta = -0.1928$, where $0^\circ \leq \theta < 360^\circ$. The correct letter(s) is(are)

_____.

5. Solve $\tan \theta = \sqrt{3}$, where $180^\circ < \theta < 360^\circ$. The correct letter(s) is(are)

_____.

6. Solve $\cos \theta = \frac{1}{2}$, where $0^\circ \leq \theta < 360^\circ$. The correct letter(s) is(are)

_____.

Solving Basic Trigonometric Equations Practice Solutions

From the chart below of possible solutions, place the correct letter in the blank.

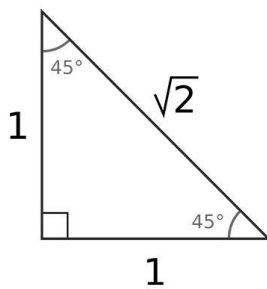
Letter	Answer	Letter	Answer	Letter	Answer	Letter	Answer
A	45°	D	101°	G	225°	J	259°
B	60°	E	126°	H	240°	K	300°
C	68°	F	141°	I	248°	L	315°

1. Solve $\sin \theta = -\frac{1}{\sqrt{2}}$, where $0^\circ \leq \theta < 360^\circ$. The correct letter(s) is(are)

G and L.

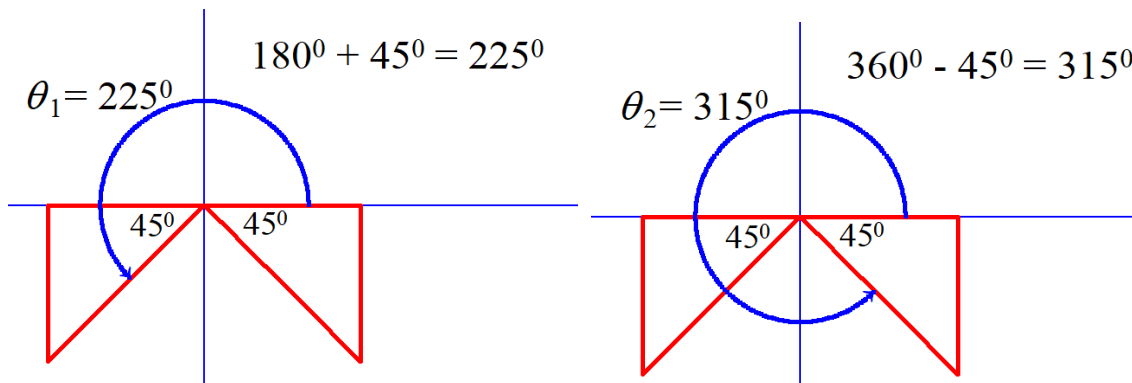
Solution

This is a special triangle ratio.



The reference angle is 45°, which we could get either from the calculator, or from our knowledge of special triangle ratios.

Using the CAST rule, sine is negative in quadrants 3 and 4.



2. Solve $\tan \theta = 2.45$, where $0^\circ \leq \theta < 360^\circ$. The correct letter(s) is(are) C and I.

Solution

This is not a special triangle ratio. Tangent is positive in quadrants 1 and 3.

Use the calculator to determine the reference angle.

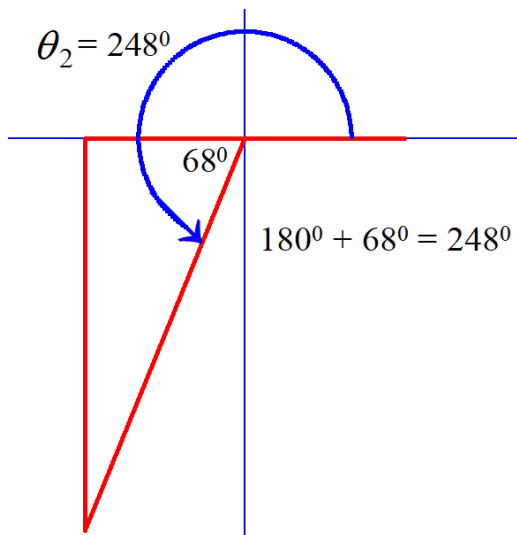
$$\tan^{-1}(2.45) \approx 68^\circ$$

In quadrant 1, the reference angle is the same as the rotation angle.

$$\theta_1 = 68^\circ$$

$$\theta_2 = 248^\circ \text{ [See below]}$$

The solutions are 68° and 248° .



3. Solve $\sin \theta = 0.6320$, where $90^\circ < \theta < 270^\circ$. The correct letter(s) is(are)

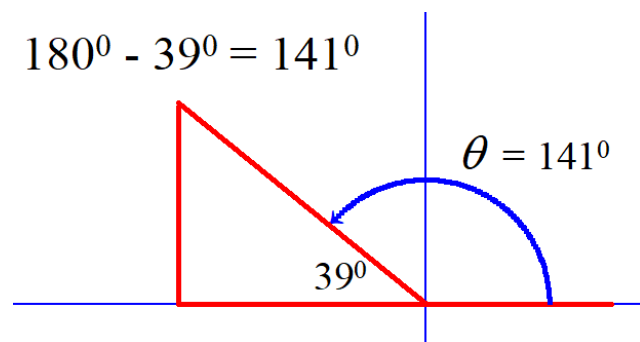
F.

Solution

Use the calculator to find the reference angle.

$$\sin^{-1}(0.6320) \approx 39^\circ.$$

Sine is positive in quadrants 1 and 2. However, the domain does not allow solutions in quadrant 1.



The solution is 141° .

4. Solve $\cos \theta = -0.1928$, where $0^\circ \leq \theta < 360^\circ$. The correct letter(s) is(are)

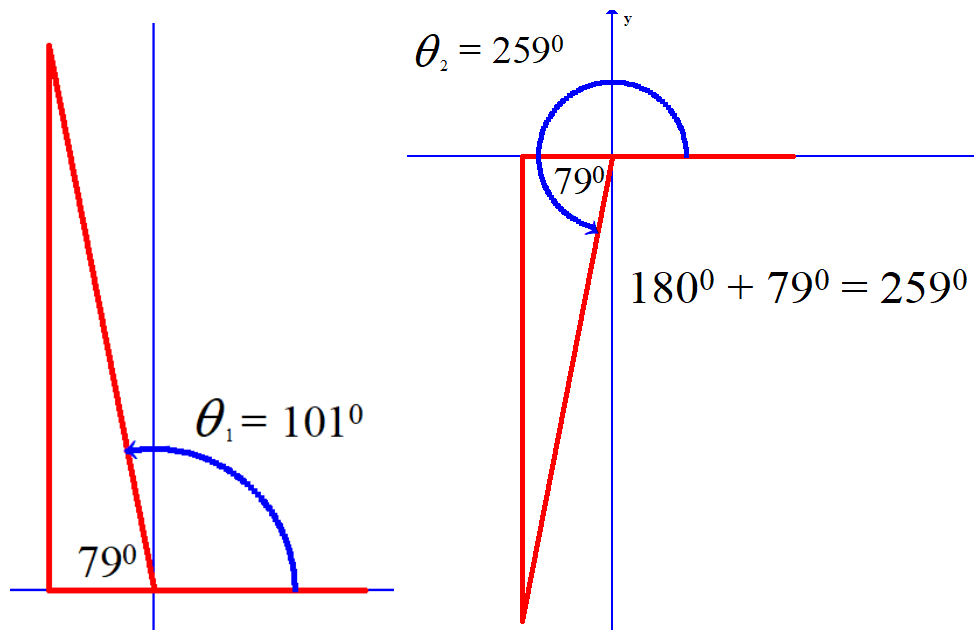
D and J.

Solution

Check the domain. Solutions are allowed in a complete circle which means there are two solutions. Cosine is negative in quadrants 2 and 3.

Use the calculator and the positive value of the ratio to determine the reference angle; $\cos^{-1}(0.1928) \approx 79^\circ$.

Sketch the triangles in quadrants 2 and 3 with a reference angle of 79° .

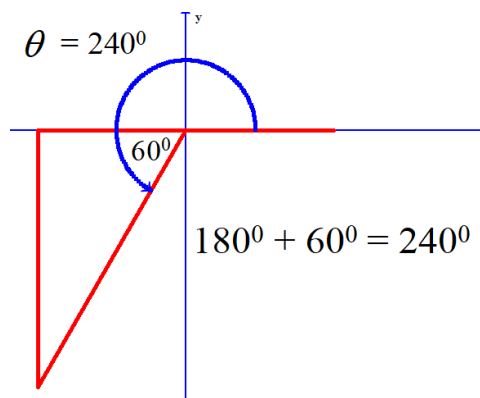


5. Solve $\tan \theta = \sqrt{3}$, where $180^\circ < \theta < 360^\circ$. The correct letter(s) is(are) H.

Solution

We have a restricted domain; $180^\circ < \theta < 360^\circ$. This tells us that solutions are only allowed in quadrants 3 and 4.

Since tangent is positive in quadrants 1 and 3, our solution will be in quadrant 3. Use the calculator to determine the reference angle; $\tan^{-1}(\sqrt{3}) = 60^\circ$. This is also a special triangle ratio.



The solution is 240° .

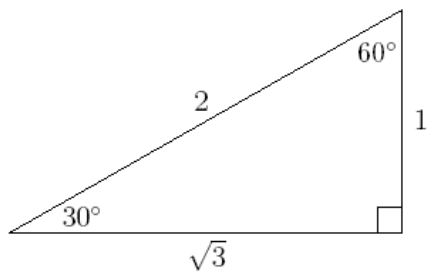
6. Solve $\cos \theta = \frac{1}{2}$, where $0^\circ \leq \theta < 360^\circ$. The correct letter(s) is(are)

B and K.

Solution

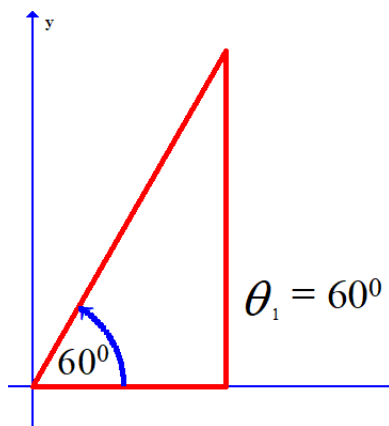
With a domain of $0^\circ \leq \theta < 360^\circ$, there will be two solutions. Cosine is positive in quadrants 1 and 4.

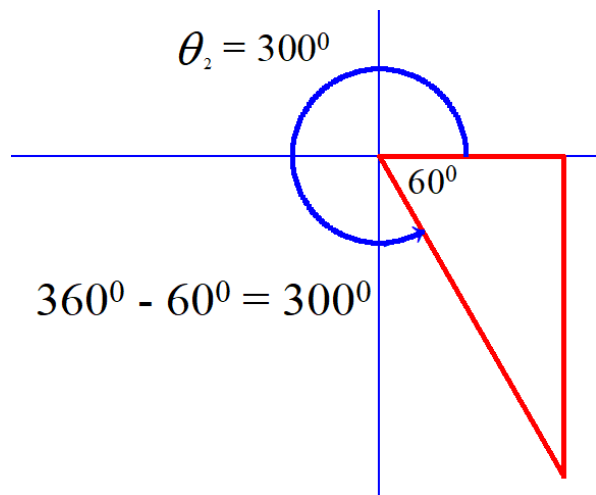
This is a special triangle ratio.



We could also use the calculator to determine that the reference angle is 60° .

Sketch the triangles in quadrants 1 and 4.





The solutions are 60° and 300° .