1) Answer: C
Explanation: Recall that the value of a tangent of an angle is the ratio of the sine of that angle to the cosine of the same angle. In symbols:

$$\tan\theta = \frac{\sin\theta}{\cos\theta}$$

When converted into degrees, $\frac{\pi}{2}$ radians is 90°
To convert radians to degrees, all we have to do is to multiply the given radian measurement by $\frac{180}{\pi}$:

$$\frac{\pi}{2} \times \frac{180}{\pi} = \frac{180\pi}{2\pi} = 90$$

Indeed, $\frac{\pi}{2}$ radians is 90°.

Note that the 90° is located in the first quadrant and it touches the point (0, 1) on the unit circle.

Hence, sin(90°) = 1 while cos(90°) = 0.

Using these values of sine and cosine of 90° to derive the value of the tangent of 90°:

$$\tan 90° = \frac{\sin 90°}{\cos 90°}$$

$$\tan 90° = \frac{1}{0}$$

The computed tangent value for 90° is 1/0. Note that 1/0 is not defined in the set of all real numbers since division by 0 (or fraction with a zero denominator) is undefined. Hence, the reason why the tangent of $\frac{\pi}{2}$ radians is undefined is because the ratio of the sine of $\frac{\pi}{2}$ and cosine of $\frac{\pi}{2}$ results in a value that is not defined in the set of real numbers.

2) Answer: A
Explanation: To find a coterminal angle to a given negative angle:

1. If the given angle is in radians, convert it to degrees. The given angle is already in degrees, so no need to perform this step.
2. Add 360° to the given angle. If the result is still negative, proceed to step 3. Otherwise, the resulting measurement is the coterminal angle.

$$-315° + 360° = 45°$$

Since we have already obtained an angle measurement that is positive, no need to push through with the next steps. The coterminal angle of -315° is 45°.

However, the given angle measurements in the options are all expressed in radians. Thus, let us convert 45° to radians by multiplying it by $\frac{\pi}{180}$:

$$45\ x\ \frac{\pi}{180} = \frac{45\pi}{180} = \frac{\pi}{4}$$

Thus, the answer is option A.

3) Answer: A
Explanation: Our solution will be much easier if we convert $\frac{5\pi}{6}$ radians into degrees first. To do so, we multiply the given radian measurement by $\frac{180}{\pi}$:

$$\frac{5\pi}{6} \times \frac{180}{\pi} = \frac{900\pi}{6\pi} = 150$$

This means that $\frac{5\pi}{6}$ radians is equal to 150°.

Since 150° is not located in the first quadrant of the coordinate plane, it's not easy to identify the point touched by the terminal side of 150° on the unit circle. For this reason, we have to use the reference angle of 150° to identify its corresponding point on the unit circle.

The reference angle of 150° can be calculated by subtracting it from 180°:

180° - 150° = 30°.

Therefore, the reference angle of 150° is the angle 30° which is now located in the first quadrant.

This means the angles 150° and 30° have the same corresponding point on the unit circle but with different signs.

The point touched by the terminal side of 30° on the unit circle is $(\frac{\sqrt{3}}{2}, \frac{1}{2})$. You can obtain this point either by using the long method discussed in the reviewer or by memorizing the table of trigonometric values (faster way).

Now, since 30° is the reference angle of 150°, then the corresponding point of 150° is also the point for 30° but with different signs.

150° is located in the second quadrant where x-coordinates are negative and y-coordinates are positive. Hence, the point touched by the terminal side of 150° on the unit circle must be $(-\frac{\sqrt{3}}{2}, \frac{1}{2})$.

4) Answer: C

Explanation: Converting $\frac{\pi}{2}$ rad to degrees, we have:

$$\frac{\pi}{2} \times \frac{180}{\pi} = \frac{180\pi}{2\pi} = 90\ degrees$$

Therefore, $\frac{\pi}{2}$ rad = 90°.

The point touched by the terminal side of 90° on the unit circle is (1,0). Using this point, we can define the cosecant of 90°.

There are two ways to derive the cosecant of 90°. First, we can use the fact that the cosecant is the reciprocal of the sine function. Second, we can use the fact that csc θ = 1/y.

First Method:

The sine of 90° is just the y-coordinate of (1,0). Therefore, sin(90°) = 0.

Since cosecant is the reciprocal of the sine function, then csc(90°) = $\frac{1}{sin\ 90°} = \frac{1}{0}$.

Division by 0 is undefined. Thus, the cosecant of 90° is undefined.

Second Method:

Cosecant function can be defined as 1/y where y is the y-coordinate of the point touched by the terminal side of the angle on the unit circle.

The y-coordinate of (1,0) is 0. Therefore, we have 1/y = 1/0.

The value of the cosecant of 90° is undefined.

Either way, we have obtained an undefined value for cosecant of 90°.

5) Answer: B
Explanation: If you have noticed from our discussions in the reviewer, the angle 45° has sine and cosine values that are both $\frac{\sqrt{2}}{2}$. It seems that the angle (or θ) we are looking for is 45°. But, we have a negative value of cosine function, specifically $-\frac{\sqrt{2}}{2}$. Cosine values are negative in the second and third quadrants (since in this portion, the x-coordinates are negative). Thus, we expect that the angle we are looking for is located in either the second or third quadrant.

Unit Circle

Answer Key

Among the given options, 135° is the only angle whose terminal side is on the second quadrant. Therefore, the angle we are looking is 135°.