Topic: Inverse trig relations

Question: Which equation can't be used to express an inverse relation?

Answer choices:

A $\arcsin(x) = \arcsin(\sin y)$

B $y = \arccos x$

C $y = \csc^{-1} x$

D $y = \dfrac{1}{\tan x}$

Solution: D

We indicate inverse sine as either $\sin^{-1}$ or as $\arcsin$ and the same for the other functions.

In Algebra, we would make a negative exponent positive by moving the term to the denominator. For instance, x^{-2} could be rewritten as $1/(x^2)$. But the -1 in $\tan^{-1}$ isn't a negative exponent, it's simply notation to indicate "inverse tangent." So

$$\tan^{-1} x \neq \frac{1}{\tan x}$$

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Question: Use the unit circle to find the angle in degrees whose sine is $\sqrt{3}/2$.

Answer choices:

A 30°

B 120°

C 150°

D 330°

Solution: B

On the unit circle, we know that the y-value in the coordinate point is the value that gives us the sine of the angle. Therefore, because we're told that sine of the angle is $\sqrt{3}/2$, we need to find the angles in the unit circle where the corresponding coordinate point has a y-value equal to $\sqrt{3}/2$. Those angles are 60° and 120°.

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Question: Use the unit circle to say which angle has a cosine whose value isn't 0.

Answer choices:

A $\frac{\pi}{2}$

B π

C $\frac{3\pi}{2}$

D $-\frac{\pi}{2}$

Solution: B

On the unit circle, we know that the x-value in the coordinate point is the value that gives us the cosine of the angle. Therefore, because we're told that cosine of the angle is 0, we need to find the angles in the unit circle where the corresponding coordinate point has an x-value equal to 0.

Those angles are $\pi/2$ and $3\pi/2$. To give the full set of radian angles, we have to give all of the angles that are coterminal with these two.

$$\theta = \left\{ \frac{\pi}{2} + 2n\pi \right\} \cup \left\{ \frac{3\pi}{2} + 2n\pi \right\}$$

Because $\pi/2$ and $3\pi/2$ differ by an angle of just π, we can consolidate this set of angles into just

$$\theta = \left\{ \frac{\pi}{2} + n\pi \right\}$$

Answer choice A is in this set when $n = 0$, answer choice C is in this set when $n = 1$, and answer choice D is in this set when $n = -1$. Only answer choice B is outside this angle set.