Question ID f80d5adb

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Circles	Easy

ID: f80d5adb

What is the value of $\cos \frac{565\pi}{6}$?

A. $\frac{1}{2}$

B. 1

C. $\frac{\sqrt{3}}{2}$

D. $\sqrt{3}$

ID: f80d5adb Answer

Correct Answer: C

Rationale

Choice C is correct. The cosine of an angle is equal to the cosine of $n(2\pi)$ radians more than the angle, where n is an integer constant. Since $\frac{565\pi}{6}$ is equivalent to $47(2\pi) + \frac{\pi}{6}$, $\cos\left(\frac{565\pi}{6}\right)$ can be rewritten as $\cos\left(47(2\pi) + \frac{\pi}{6}\right)$, which is equal to $\cos\left(\frac{\pi}{6}\right)$. Therefore, the value of $\cos\left(\frac{565\pi}{6}\right)$ is equal to the value of $\cos\left(\frac{\pi}{6}\right)$, which is $\frac{\sqrt{3}}{2}$.

Alternate approach: A trigonometric ratio can be found using the unit circle, that is, a circle with radius 1 unit. The cosine of a number t is the *x*-coordinate of the point resulting from traveling a distance of t counterclockwise from the point $(1, 0)$ around a unit circle centered at the origin in the *xy*-plane. A unit circle has a circumference of 2π. It follows that since $\frac{565\pi}{6}$ is equal to $47(2\pi) + \frac{\pi}{6}$, traveling a distance of $\frac{565\pi}{6}$ counterclockwise around a unit circle means traveling around the circle completely 47 times and then another $\frac{\pi}{6}$ beyond that. That is, traveling $\frac{565\pi}{6}$ results in the same point as traveling $\frac{\pi}{6}$. Traveling $\frac{\pi}{6}$ counterclockwise from the point $(1, 0)$ around a unit circle centered at the origin in the *xy*-plane results in the point $\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$. Thus, the value of $\cos \frac{565\pi}{6}$ is the *x*-coordinate of the point $\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$, which is $\frac{\sqrt{3}}{2}$.

Choice A is incorrect. This is the value of $\sin \frac{565\pi}{6}$, not $\cos \frac{565\pi}{6}$.

Choice B is incorrect. This is the value of the cosine of a multiple of 2π, not $\frac{565\pi}{6}$.

Choice D is incorrect. This is the value of $\frac{1}{\tan \frac{565\pi}{6}}$, not $\cos \frac{565\pi}{6}$.

Question Difficulty: Easy

Question ID 729a31a8

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Circles	Easy

ID: 729a31a8

$$(x-6)^2+(y-3)^2=81$$

The graph of the given equation in the *xy*-plane is a circle. What is the length of the radius of this circle?

A. 3

B. 6

C. 9

D. 81

ID: 729a31a8 Answer

Correct Answer: C

Rationale

Choice C is correct. The equation of a circle in the *xy*-plane can be written as $(x-h)^2+(y-k)^2=r^2$, where the center of the circle is (h, k) and the radius of the circle is r. The graph of the given equation, $(x-6)^2+(y-3)^2=81$, is a circle in the *xy*-plane. This equation can be written as $(x-6)^2+(y-3)^2=9^2$, where $h=6$, $k=3$, and $r=9$. Therefore, the radius of this circle is 9.

Choice A is incorrect. This is the *y*-coordinate of the center, not the radius, of the circle defined by the given equation.

Choice B is incorrect. This is the *x*-coordinate of the center, not the radius, of the circle defined by the given equation.

Choice D is incorrect. This is the value of the radius squared, not the radius, of the circle defined by the given equation.

Question Difficulty: Easy