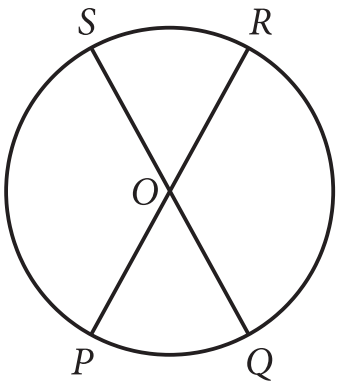
Question ID 4ff588cd

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

ID: 4ff588cd



Note: Figure not drawn to scale.

The circle shown has center O, circumference 144π, and diameters $\overline{PR}$ and $\overline{QS}$. The length of arc PS is twice the length of arc PQ. What is the length of arc QR?

A. 24π

B. 48π

C. 72π

D. 96π

ID: 4ff588cd Answer

Correct Answer: B

Rationale

Choice B is correct. Since $\overline{PR}$ and $\overline{QS}$ are diameters of the circle shown, $\overline{OS}$, $\overline{OR}$, $\overline{OP}$, and $\overline{OQ}$ are radii of the circle and are therefore congruent. Since $\angle SOP$ and $\angle ROQ$ are vertical angles, they are congruent. Therefore, arc PS and arc QR are formed by congruent radii and have the same angle measure, so they are congruent arcs. Similarly, $\angle SOR$ and $\angle POQ$ are vertical angles, so they are congruent. Therefore, arc SR and arc PQ are formed by congruent radii and have the same angle measure, so they are congruent arcs. Let x represent the length of arc SR. Since arc SR and arc PQ are congruent arcs, the length of arc PQ can also be represented by x. It's given that the length of arc PS is twice the length of arc PQ. Therefore, the length of arc PS can be represented by the expression $2x$. Since arc PS and arc QR are congruent arcs, the length of arc QR can also be represented by $2x$. This gives the expression $x + x + 2x + 2x$. Since it's given that the circumference is 144π, the expression $x + x + 2x + 2x$ is equal to 144π. Thus $x + x + 2x + 2x = 144\pi$, or $6x = 144\pi$. Dividing both sides of this equation by 6 yields $x = 24\pi$. Therefore, the length of arc QR is $2(24\pi)$, or 48π.

Choice A is incorrect. This is the length of arc PQ, not arc QR.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID 8e79ef1c

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

ID: 8e79ef1c

An angle has a measure of $\frac{9\pi}{20}$ radians. What is the measure of the angle in degrees?

ID: 8e79ef1c Answer

Correct Answer: 81

Rationale

The correct answer is 81. The measure of an angle, in degrees, can be found by multiplying its measure, in radians, by $\frac{180 \text{ degrees}}{\pi \text{ radians}}$. Multiplying the given angle measure, $\frac{9\pi}{20}$ radians, by $\frac{180 \text{ degrees}}{\pi \text{ radians}}$ yields $\left(\frac{9\pi}{20} \text{ radians}\right)\left(\frac{180 \text{ degrees}}{\pi \text{ radians}}\right)$, which is equivalent to 81 degrees.

Question Difficulty: Medium

Question ID 0ce06a95

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

ID: 0ce06a95

A circle in the *xy*-plane has the equation $(x-13)^2+(y-k)^2=64$. Which of the following gives the center of the circle and its radius?

A. The center is at $(13, k)$ and the radius is 8.

B. The center is at $(k, 13)$ and the radius is 8.

C. The center is at $(k, 13)$ and the radius is 64.

D. The center is at $(13, k)$ and the radius is 64.

ID: 0ce06a95 Answer

Correct Answer: A

Rationale

Choice A is correct. For a circle in the *xy*-plane that has the equation $(x-h)^2+(y-k)^2=r^2$, where h, k, and r are constants, (h, k) is the center of the circle and the positive value of r is the radius of the circle. In the given equation, $h=13$ and $r^2=64$. Taking the square root of each side of $r^2=64$ yields $r=\pm 8$. Therefore, the center of the circle is at $(13, k)$ and the radius is 8.

Choice B is incorrect. This gives the center and radius of a circle with equation $(x-k)^2+(y-13)^2=64$, not $(x-13)^2+(y-k)^2=64$.

Choice C is incorrect. This gives the center and radius of a circle with equation $(x-k)^2+(y-13)^2=4{,}096$, not $(x-13)^2+(y-k)^2=64$.

Choice D is incorrect. This gives the center and radius of a circle with equation $(x-13)^2+(y-k)^2=4{,}096$, not $(x-13)^2+(y-k)^2=64$.

Question Difficulty: Medium

Question ID 88041348

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

ID: 88041348

A circle in the *xy*-plane has its center at $(-4, 5)$ and the point $(-8, 8)$ lies on the circle. Which equation represents this circle?

A. msup $+ (y + 5)^2 = 5$

B. msup $+ (y - 5)^2 = 5$

C. msup $+ (y + 5)^2 = 25$

D. msup $+ (y - 5)^2 = 25$

ID: 88041348 Answer

Correct Answer: D

Rationale

Choice D is correct. A circle in the *xy*-plane can be represented by an equation of the form $(x - h)^2 + (y - k)^2 = r^2$, where (h, k) is the center of the circle and r is the length of a radius of the circle. It's given that the circle has its center at $(-4, 5)$. Therefore, $h = -4$ and $k = 5$. Substituting -4 for h and 5 for k in the equation $(x - h)^2 + (y - k)^2 = r^2$ yields $(x - (-4))^2 + (y - 5)^2 = r^2$, or $(x + 4)^2 + (y - 5)^2 = r^2$. It's also given that the point $(-8, 8)$ lies on the circle. Substituting -8 for x and 8 for y in the equation $(x + 4)^2 + (y - 5)^2 = r^2$ yields $(-8 + 4)^2 + (8 - 5)^2 = r^2$, or $(-4)^2 + (3)^2 = r^2$, which is equivalent to $16 + 9 = r^2$, or $25 = r^2$. Substituting 25 for r^2 in the equation $(x + 4)^2 + (y - 5)^2 = r^2$ yields $(x + 4)^2 + (y - 5)^2 = 25$. Thus, the equation $(x + 4)^2 + (y - 5)^2 = 25$ represents the circle.

Choice A is incorrect. The circle represented by this equation has its center at $(4, -5)$, not $(-4, 5)$, and the point $(-8, 8)$ doesn't lie on the circle.

Choice B is incorrect. The point $(-8, 8)$ doesn't lie on the circle represented by this equation.

Choice C is incorrect. The circle represented by this equation has its center at $(4, -5)$, not $(-4, 5)$, and the point $(-8, 8)$ doesn't lie on the circle.

Question Difficulty: Medium

Question ID 7ea88342

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

ID: 7ea88342

An angle has a measure of $\frac{16\pi}{15}$ radians. What is the measure of the angle, in degrees?

ID: 7ea88342 Answer

Correct Answer: 192

Rationale

The correct answer is 192. The measure of an angle, in degrees, can be found by multiplying its measure, in radians, by $\frac{180 \text{ degrees}}{\pi \text{ radians}}$. Multiplying the given angle measure, $\frac{16\pi}{15}\text{radians}$, by $\frac{180 \text{ degrees}}{\pi \text{ radians}}$ yields $\left(\frac{16\pi}{15}\text{radians}\right)\left(\frac{180 \text{ degrees}}{\pi \text{ radians}}\right)$, which simplifies to 192 degrees.

Question Difficulty: Medium

Question ID b2eb22ba

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

ID: b2eb22ba

The measure of angle R is $\frac{2\pi}{3}$ radians. The measure of angle T is $\frac{5\pi}{12}$ radians greater than the measure of angle R. What is the measure of angle T, in degrees?

A. 75

B. 120

C. 195

D. 390

ID: b2eb22ba Answer

Correct Answer: C

Rationale

Choice C is correct. It's given that the measure of angle R is $\frac{2\pi}{3}$ radians, and the measure of angle T is $\frac{5\pi}{12}$ radians greater than the measure of angle R. Therefore, the measure of angle T is equal to $\frac{2\pi}{3} + \frac{5\pi}{12}$ radians. Multiplying $\frac{2\pi}{3}$ by $\frac{4}{4}$ to get a common denominator with $\frac{5\pi}{12}$ yields $\frac{8\pi}{12}$. Therefore, $\frac{2\pi}{3} + \frac{5\pi}{12}$ is equivalent to $\frac{8\pi}{12} + \frac{5\pi}{12}$, or $\frac{13\pi}{12}$. Therefore, the measure of angle T is $\frac{13\pi}{12}$ radians. The measure of angle T, in degrees, can be found by multiplying its measure, in radians, by $\frac{180}{\pi}$. This yields $\frac{13\pi}{12} \times \frac{180}{\pi}$, which is equivalent to 195 degrees. Therefore, the measure of angle T is 195 degrees.

Choice A is incorrect. This is the number of degrees that the measure of angle T is greater than the measure of angle R.

Choice B is incorrect. This is the measure of angle R, in degrees.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium