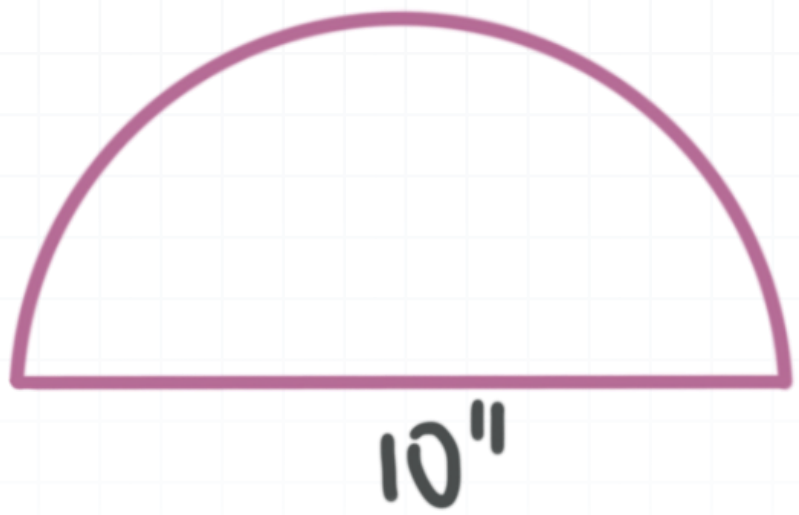
Topic: Circumference of a circle

Question: Find the length of the semicircle, assuming $\pi \approx 3.14$.



Answer choices:

A 15.7 in

B 16.7 in

C 14.7 in

D 31.4 in

Solution: A

Imagine drawing a full circle by combining two semicircles that are each of the same size as the one in the figure. Notice that the length of the line segment in the figure (10 in) is equal to the diameter of that circle. So the circumference of the circle is

$$C = \pi d$$

$$C \approx (3.14)(10 \text{ in})$$

$$C = 31.4 \text{ in}$$

Since we're looking for the length of just the semicircle, which is half the circumference of the full circle, we need to divide the circumference of the full circle by 2.

$$\text{length of semicircle} = \frac{C}{2} \approx \frac{31.4 \text{ in}}{2} \approx 15.7 \text{ in}$$

Topic: Circumference of a circle

Question: What is the circumference of a circle whose area is 12π?

Answer choices:

A $2\pi\sqrt{3}$

B 6π

C $4\pi\sqrt{3}$

D 8π

Solution: C

Since we've been given the area of the circle, we'll plug it into the formula for the area of a circle (which gives the area as a function of the radius) and then solve for the radius.

$$A = \pi r^2$$

$$12\pi = \pi r^2$$

Divide both sides by π and rearrange.

$$r^2 = 12$$

$$r = \sqrt{12} = \sqrt{4}\sqrt{3} = 2\sqrt{3}$$

Using $r = 2\sqrt{3}$, calculate the circumference.

$$C = 2\pi r$$

$$C = (2\pi)(2\sqrt{3}) = 4\pi\sqrt{3}$$

Topic: Circumference of a circle

Question: A mountain bike wheel has a diameter of 26 inches. Someone rode the bike, and stopped once the wheel had made exactly 100 revolutions. Using $\pi \approx 3.14$, estimate how far the bike moved.

Answer choices:

A 680 ft

B $1{,}110$ ft

C $2{,}607$ ft

D $8{,}164$ ft

Solution: A

The formula for the circumference of a circle is $C = \pi d$. Plugging in the approximation $\pi \approx 3.14$ that we're told to use, and the value we're given for the diameter, we get

$$C = \pi(26 \text{ in})$$

$$C \approx 3.14(26 \text{ in})$$

$$C \approx 81.64$$

This tells us that one revolution of the wheel moved the bike 81.64 inches, which means that 100 revolutions moved the bike

$$100 \cdot 81.64 = 8{,}164 \text{ inches}$$

We'll convert that to feet to get

$$8{,}164 \text{ in} \cdot \frac{1 \text{ ft}}{12 \text{ in}} = 680.3 \text{ ft} \approx 680 \text{ ft}$$