

- Riders on a Ferris wheel travel in a circle in a vertical plane. A particular wheel has radius 20 feet and revolves at the constant rate of one revolution per minute. How many seconds does it take a rider to travel from the bottom of the wheel to a point 10 vertical feet above the bottom?

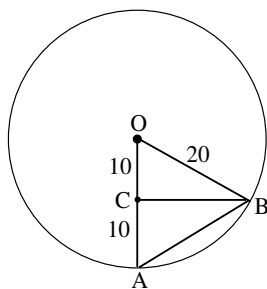
(A) 5                      (B) 6                      (C) 7.5                      (D) 10                      (E) 15

**2002 AMC 10 B, Problem #24—**

**“Use 30-60-90 triangle geometry”**

- **Solution (D)** In the figure, the center of the wheel is at  $O$ , and the rider travels from  $A$  to  $B$ . Since  $AC = 10$  and  $OB = OA = 20$ , the point  $C$  is the midpoint of  $\overline{OA}$ . In the right  $\triangle OCB$ , we have  $OC$  half of the length of the hypotenuse  $OB$ , so  $m\angle COB = 60^\circ$ . Since the wheel turns through an angle of  $360^\circ$  in 60 seconds, the time required to turn through an angle of  $60^\circ$  is

$$60 \left( \frac{60}{360} \right) = 10 \text{ seconds.}$$



**Difficulty:** Hard

**NCTM Standard:** Geometry Standard for Grades 9–12: Use visualization, spatial reasoning, and geometric modeling to solve problems.

**Mathworld.com Classification:**

Geometry > Plane Geometry > Triangles > Special Triangles > Other Triangles > 30-60-90 Triangle;

Geometry > Plane Geometry > Circles