

Lesson 7.6

Around the World

Exercise Set 7.6

In Exercises 1–10, use the π button on your calculator or use 3.14 for π . Round answers to the nearest 0.1 unit.

1. If a wagon wheel has a diameter of 70 cm, how many revolutions would it take to travel 66 meters? (In other words, how many circumferences of the circle are in 66 meters?)
2. Around the world in eighty days? If the diameter of the earth is 8000 miles, calculate your speed in miles per hour if you were to take 80 days to circumnavigate the earth about the equator.

$$\text{speed} = \frac{\text{distance}}{\text{time}} = \frac{\text{circumference}}{(80 \text{ days} \times 24 \text{ hours})}$$

- 3.* A satellite has recently been placed in a nearly circular orbit 2000 kilometers above the earth's surface. Given that the radius of the earth is approximately 6400 kilometers and that the satellite completes its orbit in 12 hours, calculate the speed of the satellite in kilometers per hour.
4. Forest Ranger Felicia Woodstack gives school tours through the Majestic Redwoods National Park. Someone in every tour undoubtedly asks, "What is the diameter of the giant redwood tree near the park entrance?"

Felicia has worked out a creative response. The redwood has a circular trunk. She asks the group to find students who can arrange themselves around the base of the tree so that by hugging the tree with arms outstretched, they can just touch fingertips to fingertips. Assuming that the arm span of each student is roughly equivalent to his or her height, Felicia asks the group to calculate the diameter of the tree.

In one group, four students with heights of 138 cm, 136 cm, 128 cm, and 126 cm were able to ring the tree. What is the approximate diameter of the redwood?



5. Wilbur Wrong is flying his remote-control plane in a circle with radius 28 meters. He is holding the wire so that it is level with the ground. His brother, Orville Wrong, clocks the plane at 16 seconds per revolution. What is the speed of their plane? Express your answer in meters per second. They may be Wrong, but you could be right!



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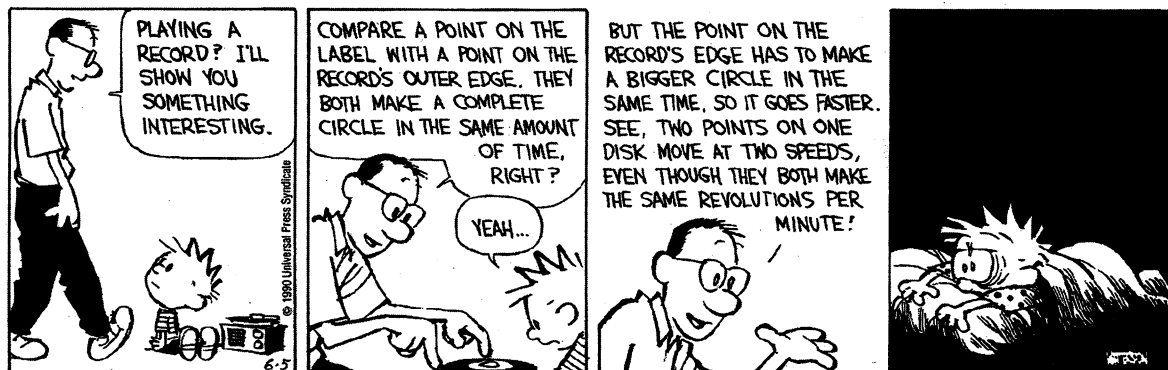
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6. Patty's Pizza Palace is known throughout the city for its delicious pizza with extra thick crust around the edge. Their small "Mama" pizza has a 6-inch radius and sells for \$9.75. The medium size "Papa" sells for \$12.00 and is a savory 8 inches in radius. The large pizza, "Uncle Giuseppe," is a hefty, mouth-watering 20 inches in diameter and sells for \$16.50. Because the edge is the thickest and best part of a Patty's Pizza, calculate which size gives the most pizza edge per dollar. Find the circumference of the pizza.

Calvin and Hobbes

by Bill Watterson



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- 7.* Calvin's father is right! Strange as it may seem, two points on the same circular disk that are at different distances from the center are actually moving at different speeds, even though they both make the same number of revolutions per minute. The diameter of a tire on a sports car is 56 cm, and the valve stem is 17 cm from the center. What is the difference between the speed of a point on the tread of the tire and the speed of another point on the valve stem when the sports car wheel is moving at 5000 rpm?
- 8.* Lúlu, unaware that it has already been done, plans to manufacture what she calls hippy hoops in two sizes: 60 cm in diameter and 90 cm in diameter. (The larger hoops play a Hawaiian tune when they are twirling). A plastics factory sells tubing for the hoops in 2.5-m lengths and 3-m lengths for \$0.20 per meter. If Lúlu needs to produce 1000 large hoops and 500 small hoops, what should she buy? How much will the plastic tubing cost?
9. Zach has been asked to design a circular table so that twelve chairs, each 16" wide, can be placed around it with at least 8" between chairs. Assuming these measurements should be taken along the circumference of the table, what should be the diameter of the table? Will it fit reasonably in a 12' by 14' dining room?
10. **A Very Tiring Problem** The diameter of a sports-car tire is approximately 60 cm. The warranty is good for 70,000 km. Will the tire make more than a million revolutions before the warranty is up? A billion? About how many revolutions will the tire make in traveling 70,000 km?