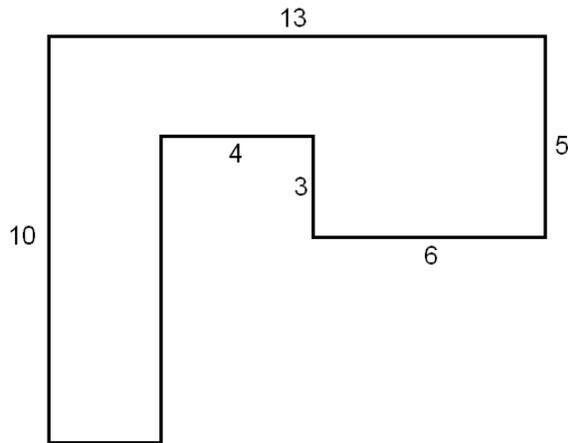


All the Way Around: Perimeter and Circumference

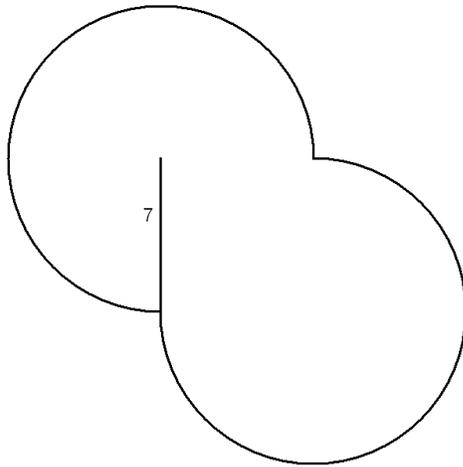
Clint Givens

January 9, 2011

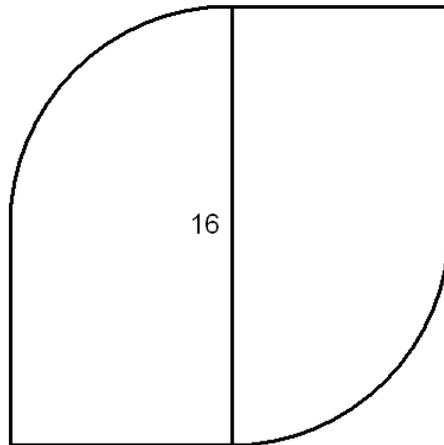
1. Find the perimeter of the following shape (all angles are right angles):



2. (a) Achilles and Tortoise are going to have a race on a circular track. Each runner has a lane in which he must run. The distance from the center of the circle to Achilles's lane is 50 feet, and Tortoise's lane is an additional 5 feet out from the center. How much of a head start should Tortoise get to make it a fair race, assuming Achilles will run around the circle twice and the finish line is the same for both of them?
- (b) Same deal, but this time the distance from the center to Achilles's lane is doubled (100 feet), and Tortoise's lane is another 5 feet further than that. What should Tortoise's head start be?

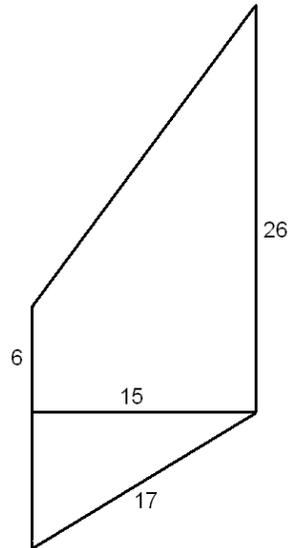


3. Find the perimeter of the shape above which is the intersection of two circles of radius 7 at right angles.
4. Find the perimeter of the shape below. The upper left and lower right are circular arcs of a circle with diameter 16, and the upper right and lower left are straight lines meeting a right angles.



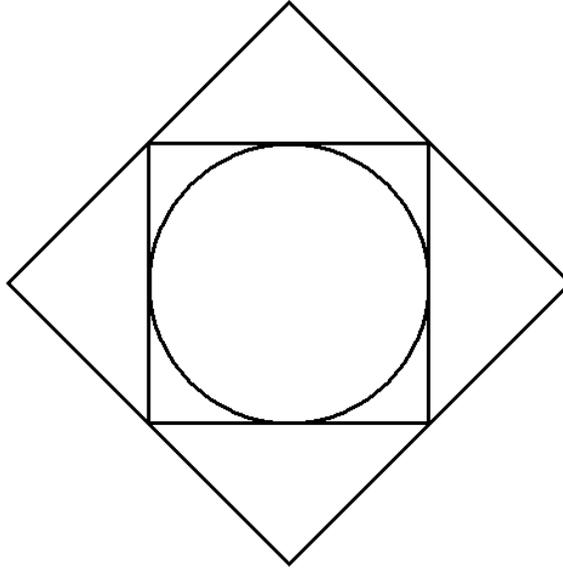
5. A vine starts at the bottom of a 28-foot tree trunk and wraps around to the top, going around exactly 7 times. If the diameter of the trunk is 3 feet, what is the length of the vine?

6. Find the perimeter of the following shape:



7. A bicycle odometer keeps track of the distance ridden by counting the number of times the tire turns. Eric's bike has 16" diameter tires, but he accidentally sets the odometer for 18" diameter tires. After a very long ride, the odometer says Eric has traveled about 47 miles. How far has he actually traveled?
8. A certain box has dimensions $6 \times 8 \times 24$ inches. What is the distance from one corner of the box to the farthest opposite corner?

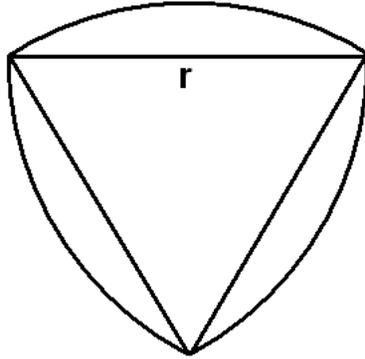
9. The area of the outside square is 16 square inches. Points A, B, C, and D are midpoints of the respective sides of the square. What is the diameter of the circle?



10. Eric is riding a bike on the planet Flurflax, and again he forgot to correctly set the odometer. But this time it's a Flurflaxian odometer, and he sees that it's set for a bike tire of diameter 40 blargs, where a blarg is a Flurflaxian unit of length. As you recall, the diameter of Eric's bike tire is 16" (which may not be equal to 40 blargs!).

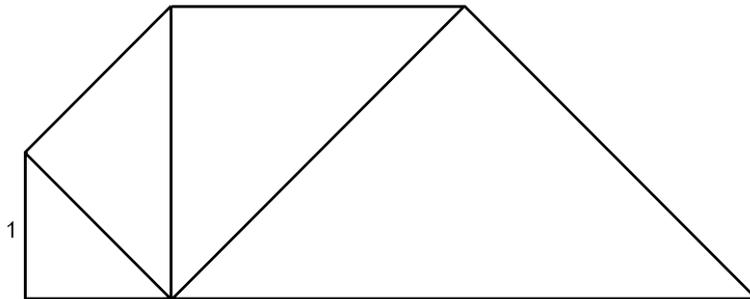
The odometer says he's traveled 86 glorks, where a glork is a *different* unit of measurement. He knows from signs that he's actually ridden a distance of 112 glorks. How far has he ridden, in miles?

11. The *Reuleaux triangle* is a shape which is not technically a triangle at all. It is formed as the intersection of three disks each of radius r , centered at the three vertices of an equilateral triangle of side length r (see picture).



What is the perimeter of the Reuleaux triangle for a given r ? (Your answer will, of course, be in terms of r .)

12. What is the perimeter of the figure below, composed of 4 right triangles?



13. Another box has dimensions $7 \times 14 \times 22$ inches. What is the distance from one corner to the far opposite corner?