Problem of the Block - Block 2

A Roll of Quarters

Take two quarters and put them on a surface, heads up, so that the profile of George Washington faces to the left on both coins. Push them together so that the ridges on their edges mesh like gears. Now hold the lower quarter in place and roll the other around it. How many revolutions will Washington's profile make?

What would happen if there were two coins of different sizes? For example, suppose the coin on top has exactly half the radius of the quarter, or the coin on top has twice the radius of the quarter. More generally, what happens when the radius r of the coin on top is k times the radius R of the coin on the bottom, where k is a positive real number?

Turn in solutions to Dr. Bean in Law 206E or by email at sbean@cornellcollege.edu by Wednesday, October 25. Hard copies only please. *Do not send electronic copies.* You may ask any Mathematics and Statistics faculty member about the questions, but Dr. Bean wrote them (and therefore at one time at least knew the answer to them) so that might be your best bet.

Solutions for only one/some questions or partial solutions will receive credit (and are encouraged!). Submitting solutions for the Problem of the Block can earn culture points toward the major in mathematics.

For more information about the Problem of the Block, including the current leader board for the yearly competition, and to print off your own copy visit http://www.cornellcollege.edu/mathematics/problem-of-the-block/index.shtml..