Problem of the Week
Problem B and Solution
Round and Round with Robbie

Problem
Cool Cole has been building his robot Robbie for the big 4 metre drag race. He has learned that his robot moves 75 mm in a straight line every time its tires do a full 360 degree rotation. He programs Robbie to do 50 tire rotations for the race.

a) Robbie is 25 cm long. If the race starts with the nose of the robot touching the starting line, will the nose of the robot get to the end line of the drag race after 50 rotations?

b) How many complete rotations will his robot’s tires need to do in order for the entire robot to completely cross the finish line?

Solution

a) In 50 rotations, Robbie will move

\[ 50 \times 75 = 3750 \text{ mm}, \text{ or } 3.75 \text{ m}. \]

Since the race is 4 m, this is not enough for Robbie’s nose to cross the finish line.

b) To completely cross the finish line, Robbie must go the 4 m of the race, plus 25 cm, the length of the robot. Thus it must travel 4.25 m, or 4250 mm, which is \( 4250 \div 75 = 56\frac{2}{3} \) rotations.

So Robbie’s back end will cross the finish line during the 57th rotation.