G-MG Running around a track II

Task

An Olympic 400 meter track is made up of two straight sides, each measuring 84.39 meters in length, and two semi-circular curves with a radius of 36.5 meters as pictured below:

In a 400 meter race, runners are staggered with those in the outermost lanes starting the furthest ahead on the track: this way they can all complete the race at a finishing line perpendicular to the track in the straightaway where they begin the race. The width of each lane is 1.22 meters. Also important for this problem is the fact, as per Olympic guidelines, that the 400 meter distance for lane 1 is measured 30 centimeters from the inside of the track, and 20 centimeters from the inside of each other lane. This is pictured below:
a. How does the perimeter of the track 20 centimeters from the inside of lane 2 compare to the perimeter 30 centimeters from the inside of lane 1? How far ahead should the runner in lane 2 start, compared to the runner in lane 1, if they are both to complete 400 meters at the finishing line on the straightaway section?

b. How does the perimeter of the track 20 centimeters from the inside of lane 3 compare to the perimeter 20 centimeters from the inside of lane 2? How far ahead should the runner in lane 3 start, compared to the runner in lane 2, if they are both to complete 400 meters at the finishing line on the straightaway section?

c. In a longer distance race where the runners are all toward the inside of the track, why is it more efficient for a runner wishing to pass others to do so in the straightaway section of the track instead of through the curves?