

Olympic Track and Field

Exploring Circumference and Perimeter

Objective: Using the calculator to compare the length of the lanes on an Olympic Track.

NCTM Standards: Geometry; Mathematical Connections; Mathematics as Problem-Solving

Using this Activity:

In this activity, students can use the calculator to find the diameter of each of the semicircular ends of the Olympic track. Students will use the **SHIFT** **EXP** keys. Elicit/review formulas for the perimeter (circumference) and area of circles and rectangles.

Answers:

1. Since the length of the track is 400 meters and the length of each straight part is 90 meters, the length (circumference) of the two semicircles is :

$$400 - 2 \times 90 = 220$$

$$C = 220$$

$$\pi d = 220$$

$$\text{So, } d \approx 70.028$$

2. The area of the infield is: $90 \times 70 + \pi\left(\frac{70}{2}\right)^2 \approx 10.150$ sq meters

3. The diameter of each successively larger circle is 2 meters longer than the previous lane. Hence, the length of the outside lane is:

$$2(90) + \pi(70.028 + 14) \approx 444 \text{ meters}$$

which is approximately 44 meters longer than the inside lane.

Thinking Cap

The inside lane is 400 meters. The length of the next 7 lanes are as follows:

Lane 2 $2(90) + \pi(70.028 + 2) \approx 406.3$ meters

Lane 3 $2(90) + \pi(70.028 + 4) \approx 412.5$ meters

Lane 4 $2(90) + \pi(70.028 + 6) \approx 418.8$ meters

Lane 5 $2(90) + \pi(70.028 + 8) \approx 425.1$ meters

Lane 6 $2(90) + \pi(70.028 + 10) \approx 431.4$ meters

Lane 7 $2(90) + \pi(70.028 + 12) \approx 437.7$ meters

Lane 8 $2(90) + \pi(70.028 + 14) \approx 444$ meters

Each runner must start approximately 6.3 meters apart at the beginning of the race.