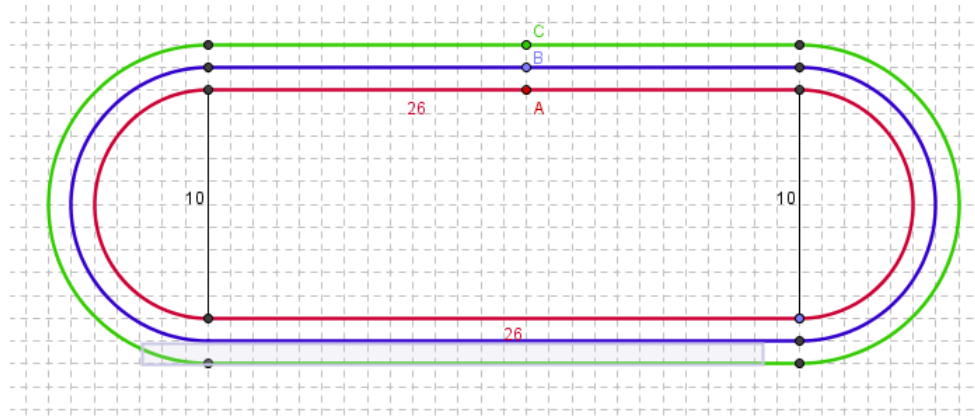


Student Activity: To investigate a rectangular race track with circular ends

Use in connection with the interactive file, 'Race Track', on the Student's CD.



Note: In the diagram above the straight sections of each track is 26m, the diameter of the inner track is 10m and the distance between each track and the next track is 1m.

1. Given that the diameter of the inside semicircle is 10m, find
 - a. The diameter of the second semicircle.

- b. The diameter of the third semicircle.

- c. The circumference of the third semicircle. Show your calculations.

2. If runner A starts at point A on the diagram and follows the inner line on the track in the diagram, what distance will this runner need to run in order to complete one circuit of the track? Show your calculations.

3. What impact would a different starting point have on the distance runner A had to run, provided he followed the same track and arrived back where he started?

4. If runner B follows the middle track in the diagram:
- What will the radius of the semicircular section of runner B's track be if the distance between the tracks is 1m?

- What distance will runner B have to run in order to complete one circuit of the track, if this runner starts at point B in the diagram? Show your calculations.

- How far would runner B's starting point need to be moved forward in order to make it a fair race, such that runners A and B would have the same distance to travel? Explain your answer.

5. If runner C follows the outer track in the diagram:
- What will the radius of the semicircular section of runner C's track be if the distance between the tracks is 1m? Show your calculations.

- What distance will runner C need to run in order to complete one circuit of the track, if this runner starts at point C in the diagram? Show your calculations.

- How far would runner C's starting point need to be moved forward in order to make it a fair race, such that runners A and C would have the same distance to travel? Explain your answer.

6. Assuming there is a runner D , who runs on a track 1m out from runner C:
- What will the radius of the semicircular section of runner D's track be given the distance between the tracks is 1m? Show your calculations.

- What distance will runner D need to run in order to complete one circuit of the track? Show your calculations.

- How far would runner D's starting point need to be moved forward in order to make it a fair race, such that runners A and D would have the same distance to travel? Explain your answer.

7. What effect would increasing the diameter of the inner circular track by 1m have on the distance runners A, B and C would have to run in order to do a complete circuit of their tracks?

8. What effect would increasing the straight section of the inner track by 1m have on the distance runners A, B and C would have to run in order to do a complete circuit of their tracks?

9. Would doubling the diameter of the inner circular track and doubling the straight section of the track double the length of the track for runner A, who runs on the inner track? Explain your answer.

10. A gardener has a flower bed in the shape of a rectangle with a semi circle at each end. The dimensions of the rectangle are 3m by 4m and the diameter of the semicircle is 4m.

a. Draw a scaled diagram of the flower bed using the scale 1m=2cm.

b. What is the area of the flower bed?

c. The gardener decides to add a 1m path around the outside of the garden. What will the inside length of this path be?

d. What will the area of the garden plus path be?

e. What will the area of the path be?

f. What will be the minimum dimensions of the garden be in order to accommodate the flowerbed and path? Represent this in a diagram.

g. The gardener decides to raise the flower bed by a uniform height of 50cm. What volume of soil will be required to do this?
