## Lesson 9: Applying Area of Circles

Let’s find the areas of shapes made up of circles.

### 9.1: Still Irrigating the Field

The area of this field is about 500,000 m2. What is the field’s area to the nearest square meter? Assume that the side lengths of the square are exactly 800 m.



* 502,400 m2
* 502,640 m2
* 502,655 m2
* 502,656 m2
* 502,857 m2

### 9.2: Comparing Areas Made of Circles

1. Each square has a side length of 12 units. Compare the areas of the shaded regions in the 3 figures. Which figure has the largest shaded region? Explain or show your reasoning.
* 
1. Each square in Figures D and E has a side length of 1 unit. Compare the area of the two figures. Which figure has more area? How much more? Explain or show your reasoning.
* 

#### Are you ready for more?

Which figure has a longer perimeter, Figure D or Figure E? How much longer?

### 9.3: The Running Track Revisited

The field inside a running track is made up of a rectangle 84.39 m long and 73 m wide, together with a half-circle at each end. The running lanes are 9.76 m wide all the way around.



What is the area of the running track that goes around the field? Explain or show your reasoning.

### Lesson 9 Summary

The relationship between $A$, the area of a circle, and $r$, its radius, is $A=πr^{2}$. We can use this to find the area of a circle if we know the radius. For example, if a circle has a radius of 10 cm, then the area is $π⋅10^{2}$ or $100π$ cm2. We can also use the formula to find the radius of a circle if we know the area. For example, if a circle has an area of $49π$ m2 then its radius is 7 m and its diameter is 14 m.

Sometimes instead of leaving $π$ in expressions for the area, a numerical approximation can be helpful. For the examples above, a circle of radius 10 cm has area about 314 cm2. In a similar way, a circle with area 154 m2 has radius about 7 m.

We can also figure out the area of a fraction of a circle. For example, the figure shows a circle divided into 3 pieces of equal area. The shaded part has an area of $\frac{1}{3}πr^{2}$.





© CC BY Open Up Resources. Adaptations CC BY IM.