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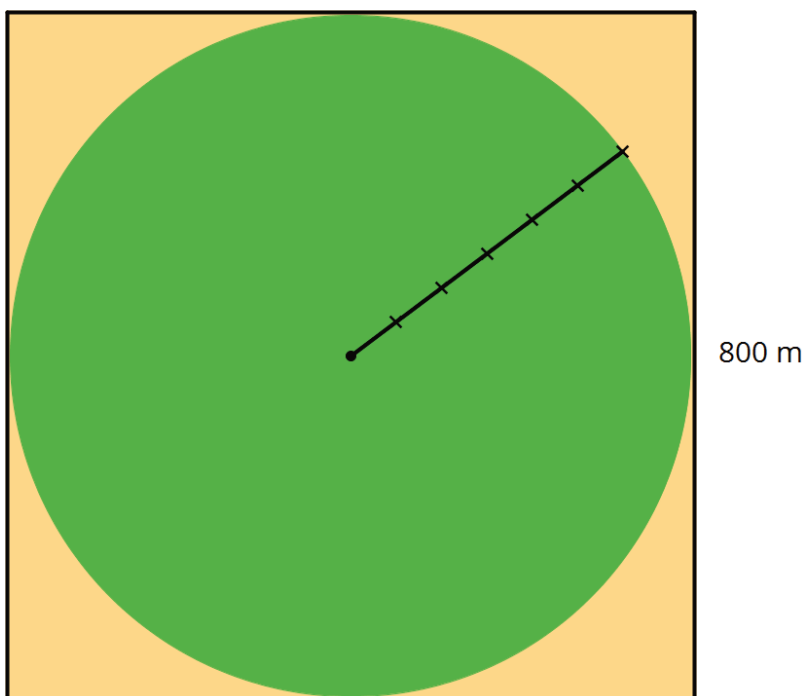
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Unit 3, Lesson 9: Applying Area of Circles

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

9.1: Still Irrigating the Field

The area of this field is about $500,000 \text{ m}^2$. What is the field's area to the nearest square meter? Assume that the side lengths of the square are exactly 800 m .



- A. $502,400 \text{ m}^2$
- B. $502,640 \text{ m}^2$
- C. $502,655 \text{ m}^2$
- D. $502,656 \text{ m}^2$
- E. $502,857 \text{ m}^2$

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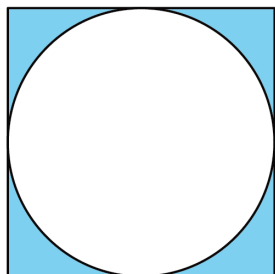
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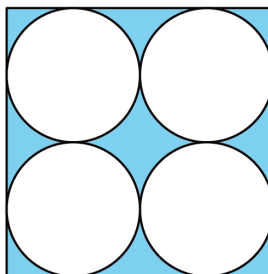
9.2: Comparing Areas Made of Circles

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.

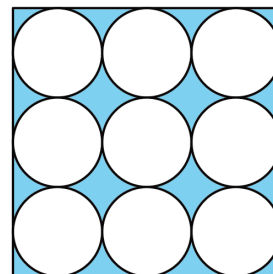
A



B

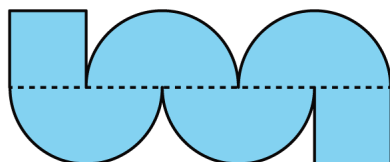


C

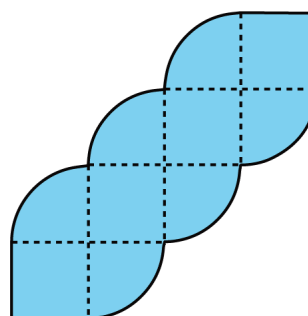


2. Each square in Figures D and E has a side length of 1 unit. Compare the area of the two figures. Which figure has more area? How much more? Explain or show your reasoning.

D



E



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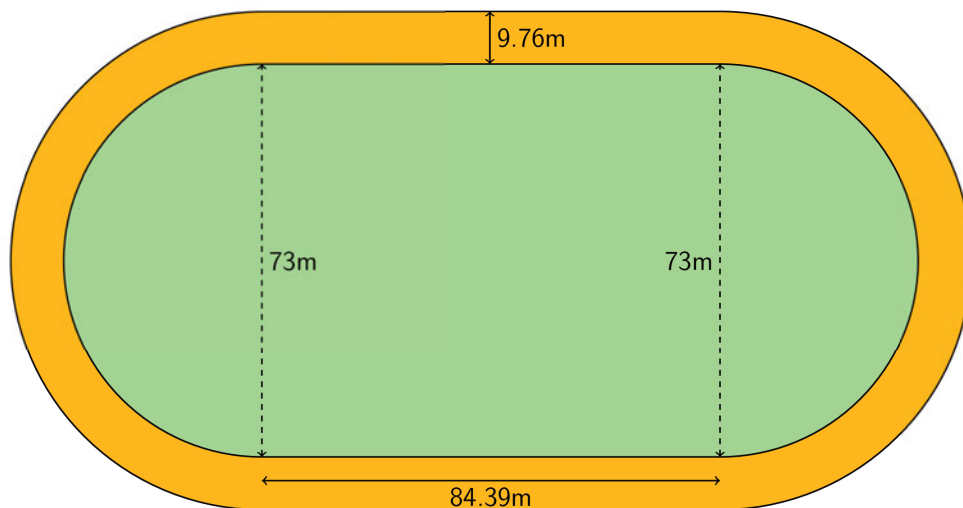
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Are you ready for more?

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.

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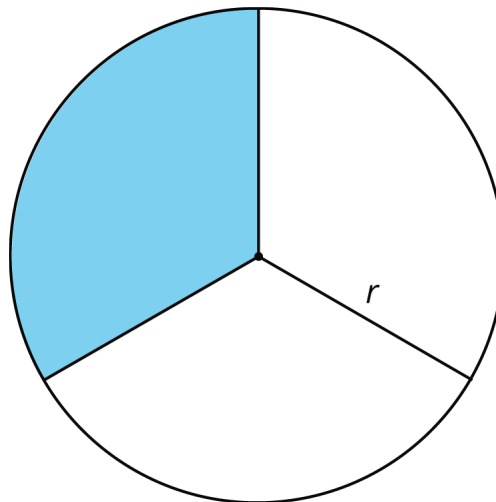
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Lesson 9 Summary

The relationship between A , the area of a circle, and r , its radius, is $A = \pi r^2$. 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 $\pi \cdot 10^2$ 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 $\frac{1}{3}\pi r^2$.



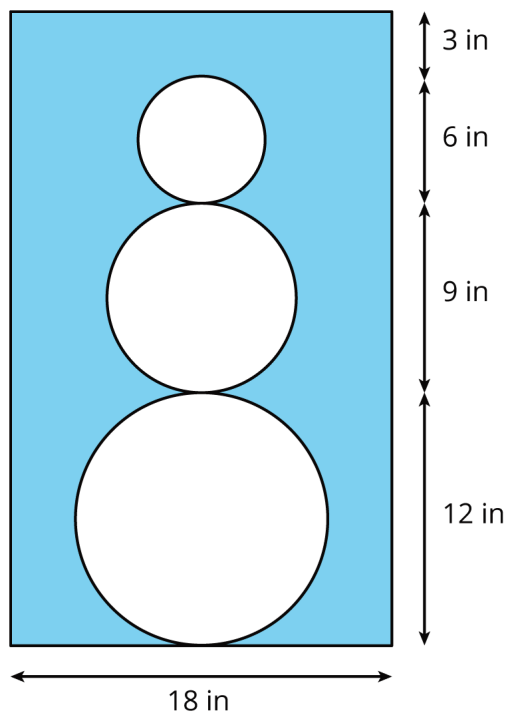
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Unit 3, Lesson 9: Applying Area of Circles

1. A circle with a 12 inch diameter is folded in half and then folded in half again. What is the area of the resulting shape?
2. Find the area of the shaded region. Express your answer in terms of π .



3. The face of a clock has a circumference of 63 in. What is the area of the face of the clock?

(from Unit 3, Lesson 8)

4. Which of these pairs of quantities are proportional to each other? For the quantities that are proportional, what is the constant of proportionality?
 - a. Radius and diameter of a circle
 - b. Radius and circumference of a circle
 - c. Radius and area of a circle

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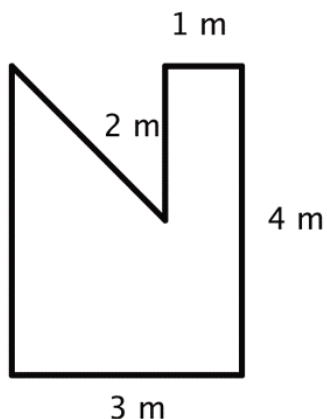
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d. Diameter and circumference of a circle

e. Diameter and area of a circle

(from Unit 3, Lesson 7)

5. Find the area of this shape in two different ways.



(from Unit 3, Lesson 6)

6. Elena and Jada both read at a constant rate, but Elena reads more slowly. For every 4 pages that Elena can read, Jada can read 5.

a. Complete the table.

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pages read by Elena	pages read by Jada
4	5
1	
9	
s	
	15
	j

b. Here is an equation for the table: $j = 1.25e$. What does the 1.25 mean?

c. Write an equation for this relationship that starts $e = \dots$

(from Unit 2, Lesson 5)