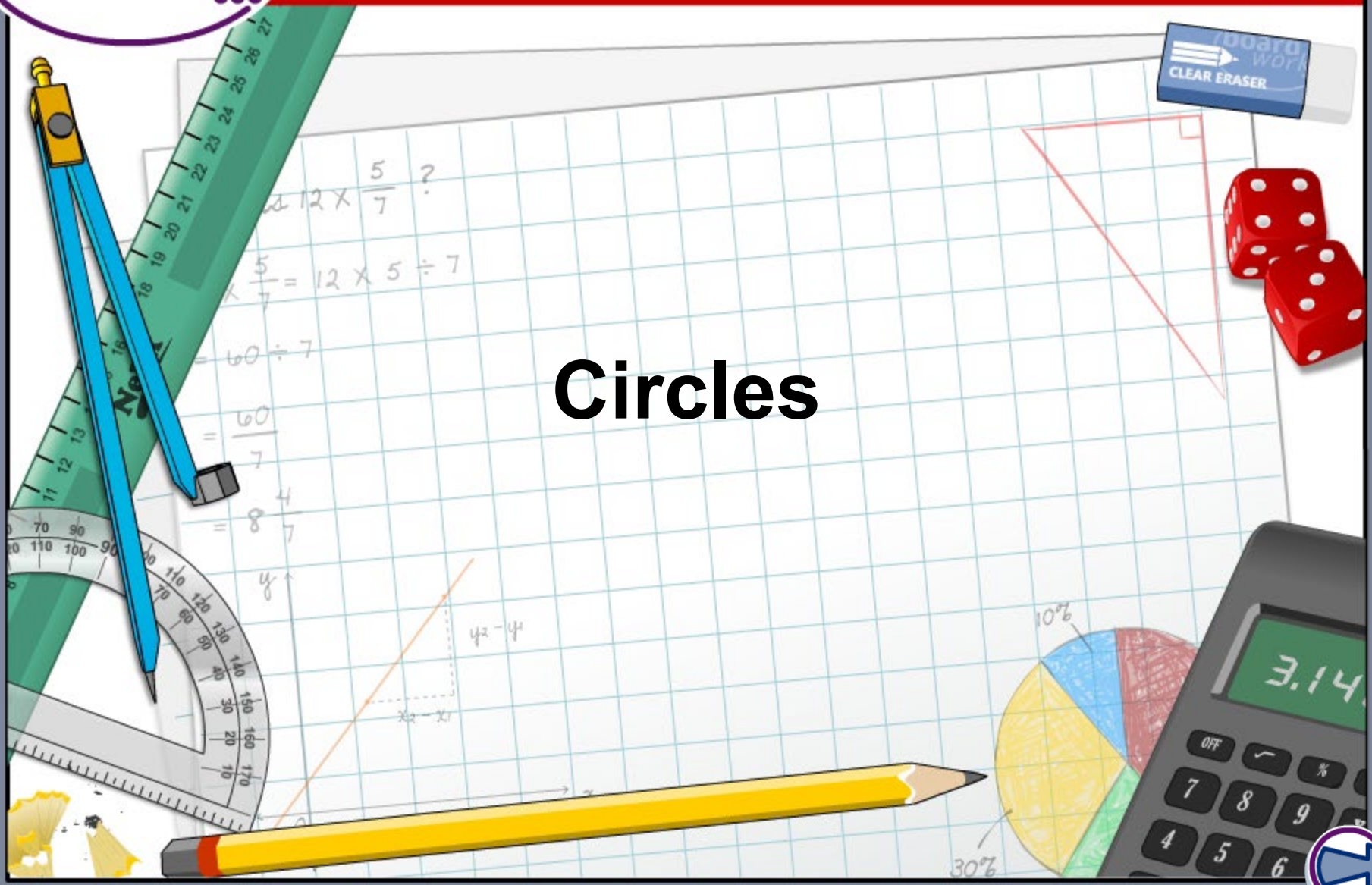


Circles

Information

Common core icons

This icon indicates a slide where the Standards for Mathematical Practice are being developed. Details of these are given in the Notes field.

Slides containing examples of mathematical modeling are marked with this stamp.

This icon indicates an opportunity for discussion or group work.

The **Standards for Mathematical Practice** outlined in the Common Core State Standards for Mathematics describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

These are:

1) Make sense of problems and persevere in solving them.

2) Reason abstractly and quantitatively.

3) Construct viable arguments and critique the reasoning of others.

4) Model with mathematics.

5) Use appropriate tools strategically.

6) Attend to precision.

7) Look for and make use of structure.

8) Look for and express regularity in repeated reasoning.

This icon indicates that the slide contains activities created in Flash. These activities are not editable.

This icon indicates teacher's notes in the Notes field.

Introducing circles

Circles

A circl

Press **start** to find out about circles and naming the parts of a circle.

start

Naming the parts of a circle

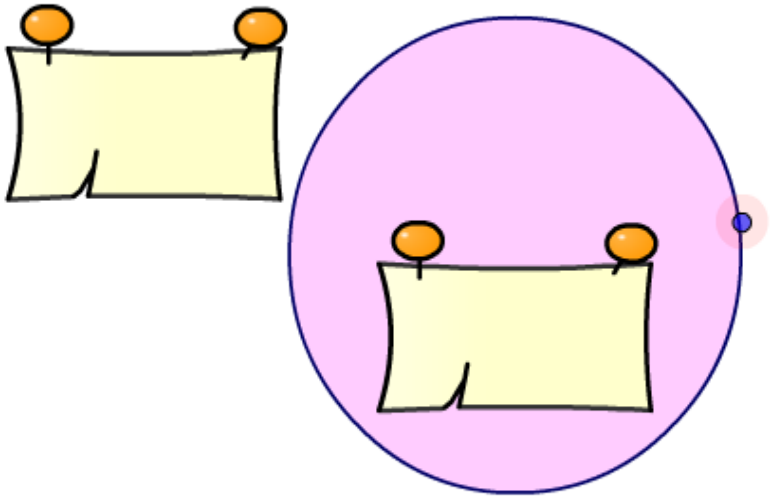
Can you name the orange parts of these circles?

Press **start** to begin.

start

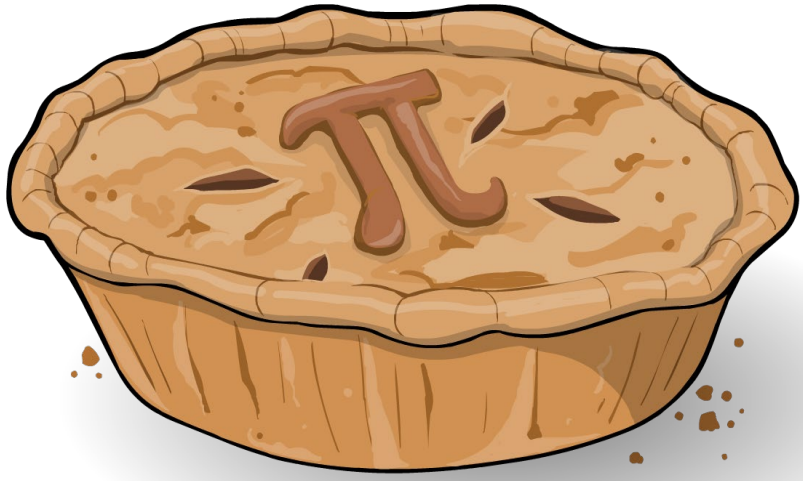
Circumference and diameter

Drag the point to change the dimensions of the circle.



The value of π

For any circle, the circumference is always just over three times bigger than the radius.



The exact number is called **π** (**pi**).

We use the symbol π because the number cannot be written exactly.

π = 3.14159265358979323846264338327950288419716939937510582097494459230781640628620899862803482534211706798214808651328230664709384460955058223172535940812848111745028410270193852110555964462294895493038196… (to 200 decimal places)

Approximate values of pi

When we are doing calculations involving π we need to use an **approximation** for the value.

A useful approximation is **3.14** or $^{22}/_{7}$

We can also use the π button on a calculator.

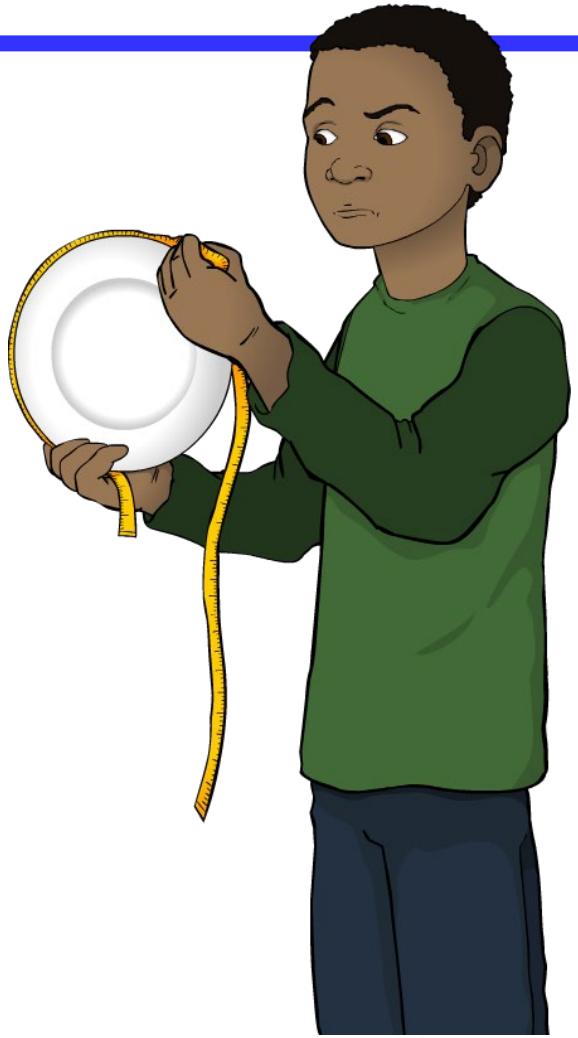
Most questions will tell you which approximation to use.

When a calculation has lots of steps, we write pi as a symbol throughout and evaluate it at the end.

A formula for circumference

For any circle: $\pi = \dfrac{\text{circumference}}{\text{diameter}} = \dfrac{C}{d}$

How can we rearrange this formula to make a formula for the circumference of a circle?



circumference = $\pi \times$ diameter

$$C = \pi d$$

Using the radius

We can also use the **radius** to find the circumference.

The diameter of a circle is two times its radius:

$$d = 2r$$

Using what we already know, how can we use this to give a formula for circumference using the radius?

We can substitute $d = 2r$ into our first formula for circumference:

$$C = \pi d$$

This gives us a formula for circumference using the radius.

$$C = 2\pi r$$

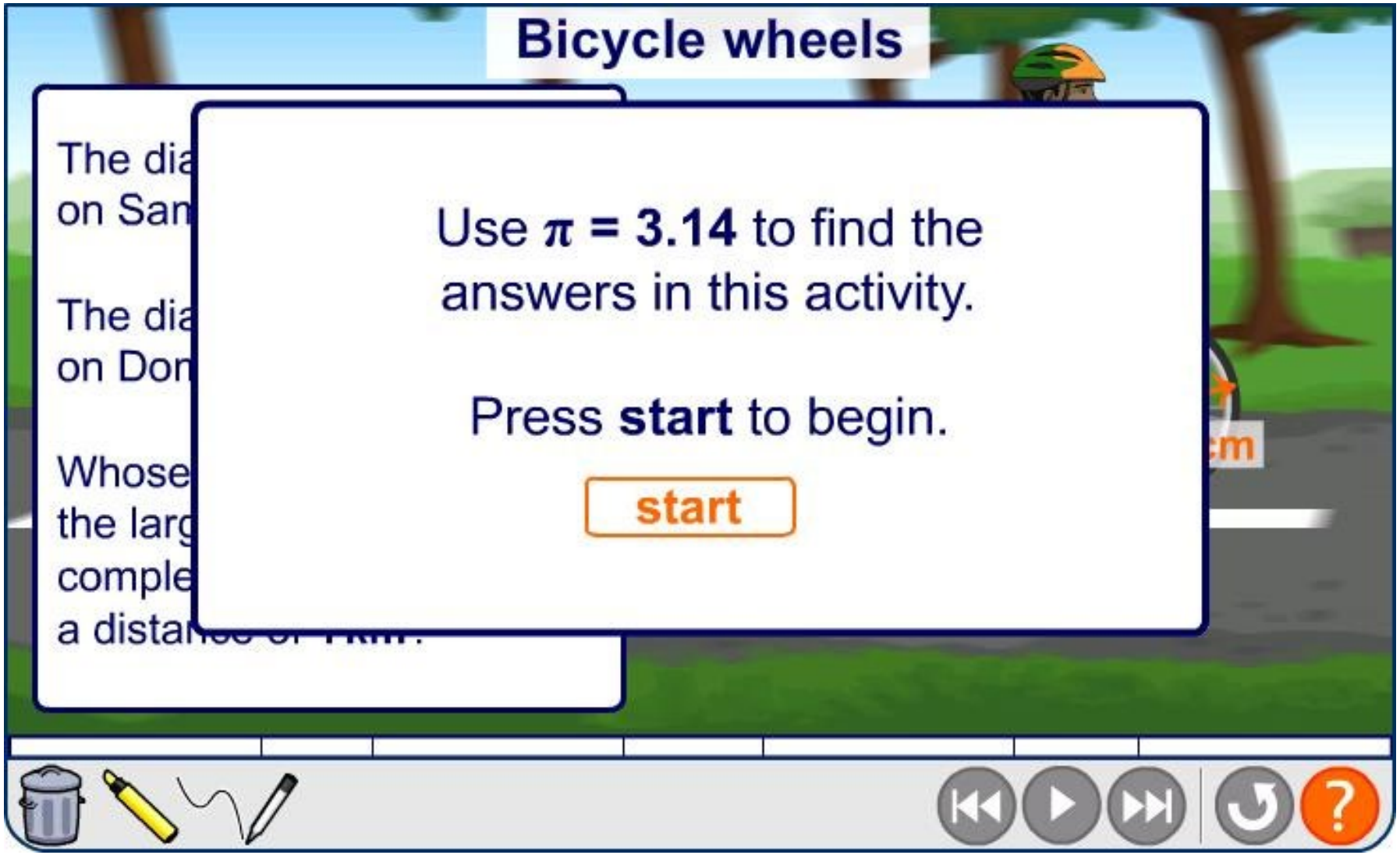
Finding the circumference

Use π = **3.14** to find the circumference of these circles.

Press **start** to begin.

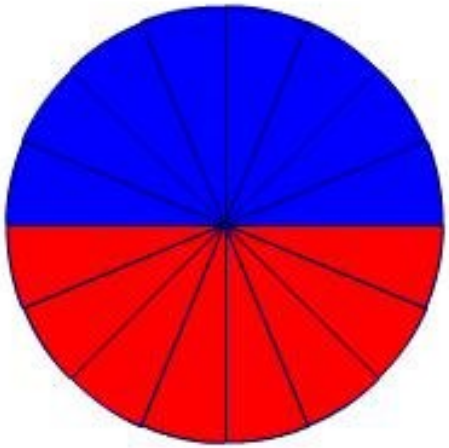
start

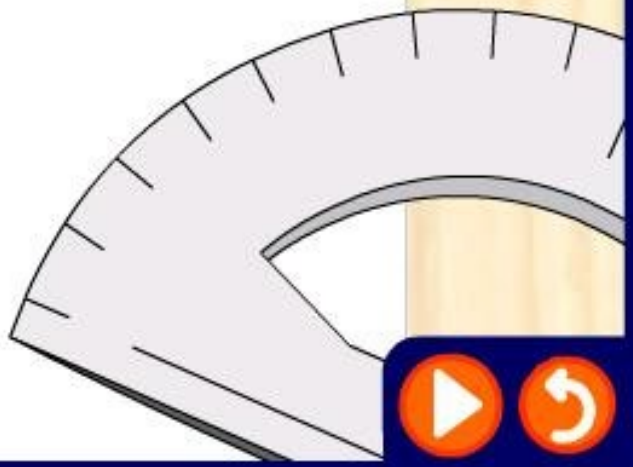
Circumference problem



Deducing the area of a circle

Press play to move through the animation.





Finding the area

We can find the area of a circle using the formula **area** = πr^2.

Use π = **3.14** to find the area of these circles.

Press **start** to begin.

start

Area problem 1

Use π = 3.14 to find area of the shape below.

The area of the shape is made up of the area of a **circle** of diameter 13 yd and the area of a **rectangle** of width 6 yd and length 13 yd.

Area of circle = 3.14×6.5^2

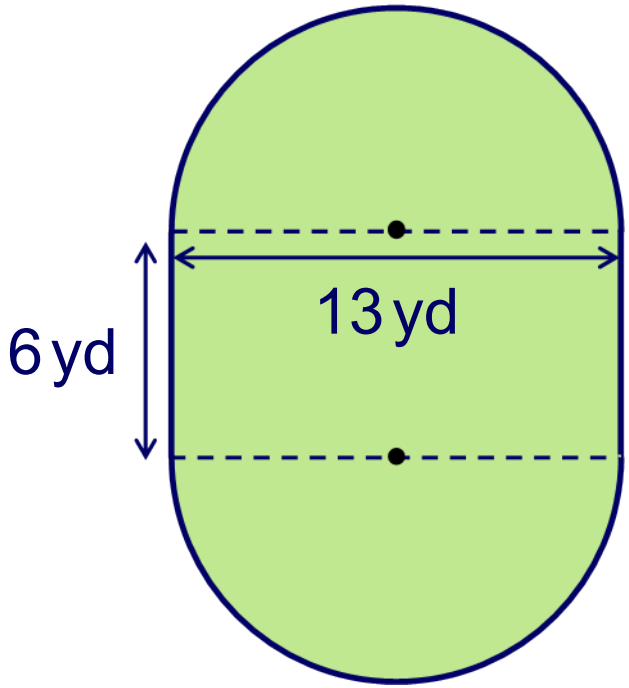
$= 132.665\ \text{yd}^2$

Area of rectangle = 6×13

$= 78\ \text{yd}^2$

Total area = $132.665 + 78$

$= \mathbf{210.665\ \text{yd}^2}$



Area problem 2

Use $\pi = 3.14$ to find area of the sector below.

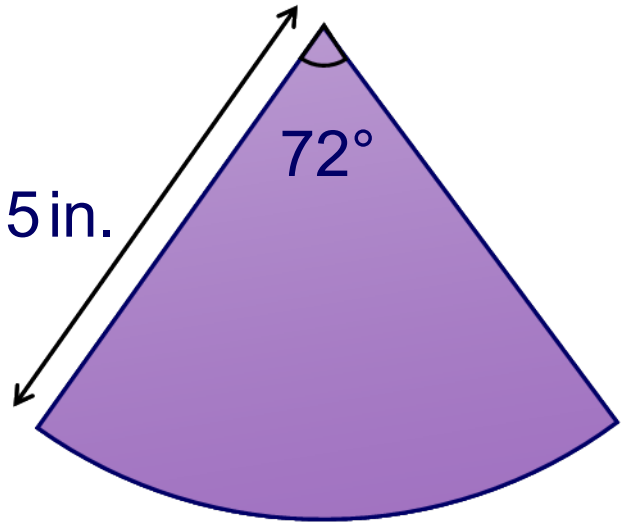
The area of a sector is a fraction of the area of a full circle.
We can find this by dividing the angle at the center by 360°.

$$\text{Area} = \frac{72°}{360°} \times \pi \times 5^2$$

$$= \frac{1}{5} \times \pi \times 5^2$$

$$= \pi \times 5$$

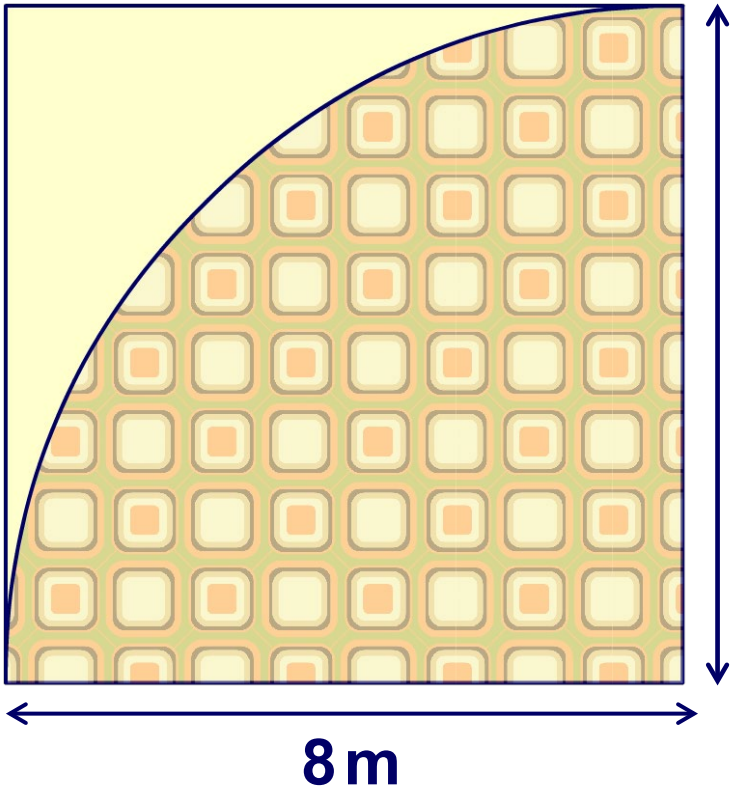
$$= 15.7 \text{ in.}^2$$



We can use this method to find the area of any sector.

Area problem 3

The living room in John's home has a large rug that covers most of the floor. What area of the floor is *not* covered by the rug? Use $\pi = 3.14$ as an approximate value for pi.



Area of the square $= 8 \times 8$

$= 64\,m^2$

Area of sector $= \frac{1}{4} \times \pi \times 8^2$

$= 16\pi$

Area not covered by the rug

$= 64 - 16\pi$

$= 13.76\,m^2$