# Today's Materials

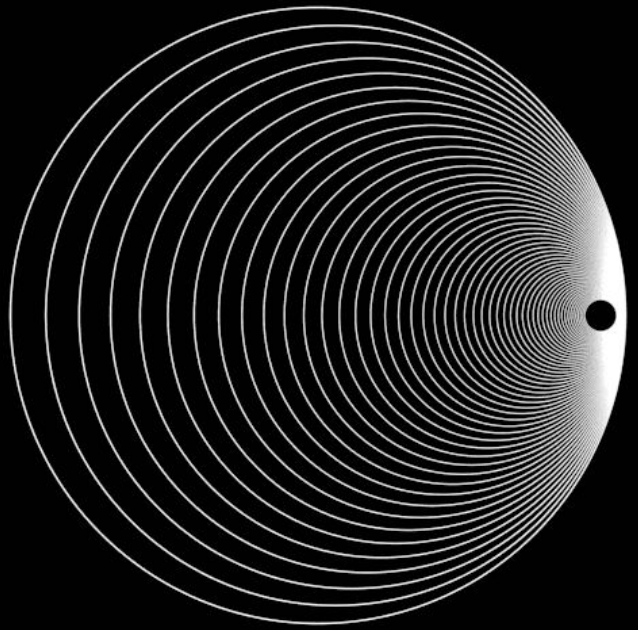
- device
- calculator
- pencil
- notebook
- glue

# Exploring the Area of a Circle

| | |
|---|---|
| CCSS Standards: Addressing | • 7.G.A<br>• 7.G.B<br>• 7.G.B.4<br>• 7.RP.A.2.a |
| CCSS Standards: Building towards | • 7.G.B.4 |

**Lesson 7**

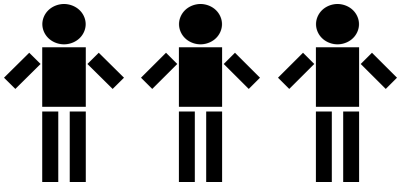
# Let's investigate the Areas of circles!



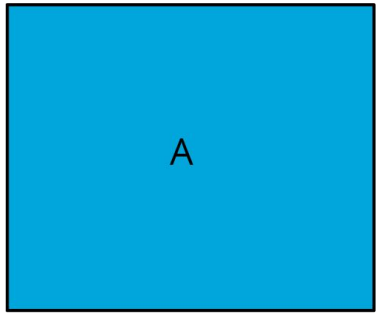
# Today's Goals

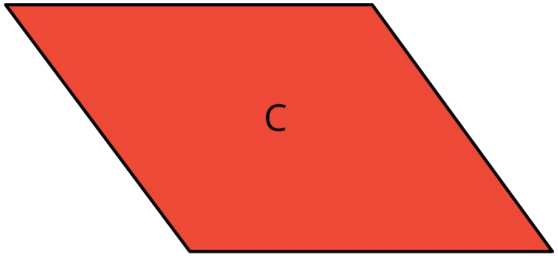
- ❑ If I know a circle's **radius** or **diameter**, I can find an approximate for its **area**.
- ❑ I know whether or not the relationship between the **diameter** and **area** of a circle is proportional, and I can explain how I know.

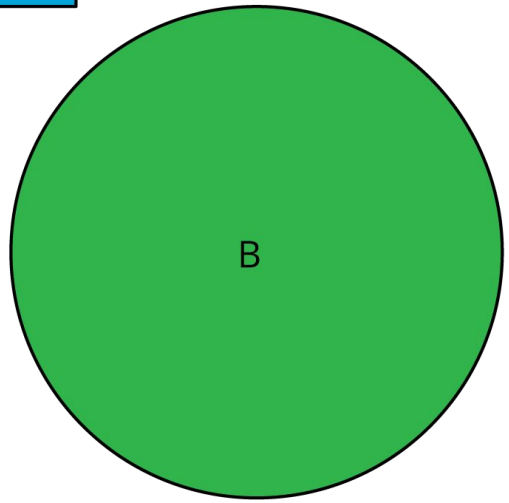
# Estimating Areas



# Give me a Thumbs up when you have an idea of which figure has the largest area.



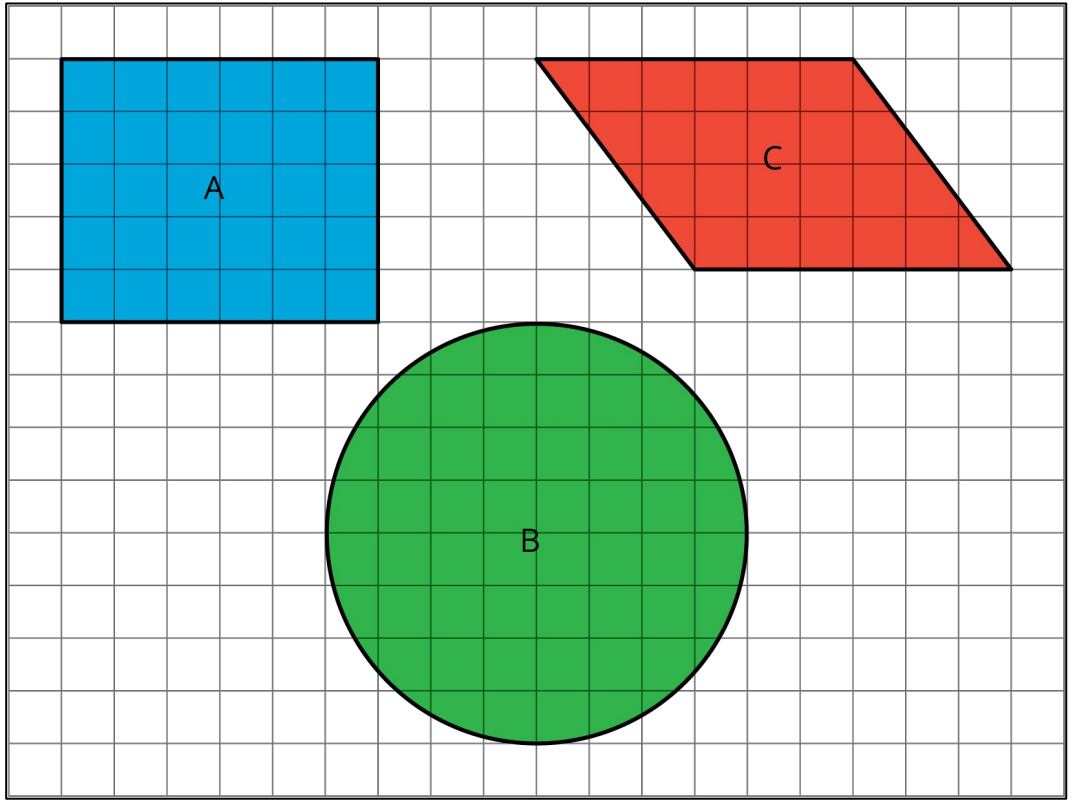




- ★ Begin with Quiet Think Time.
- ★ Share your ideas and reasoning with your group.

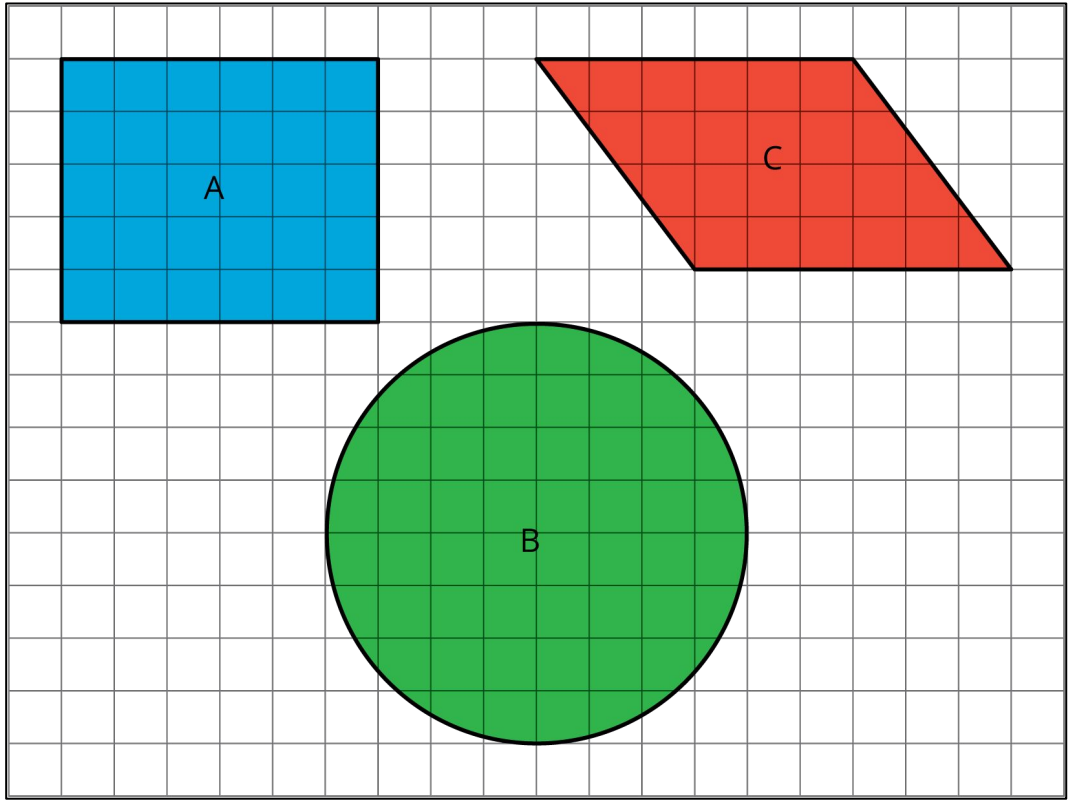
**How would you find or estimate the area of each of these figures?**

Share your thinking as a group.



**Do you think it is possible to calculate the area of the circle *exactly*?**

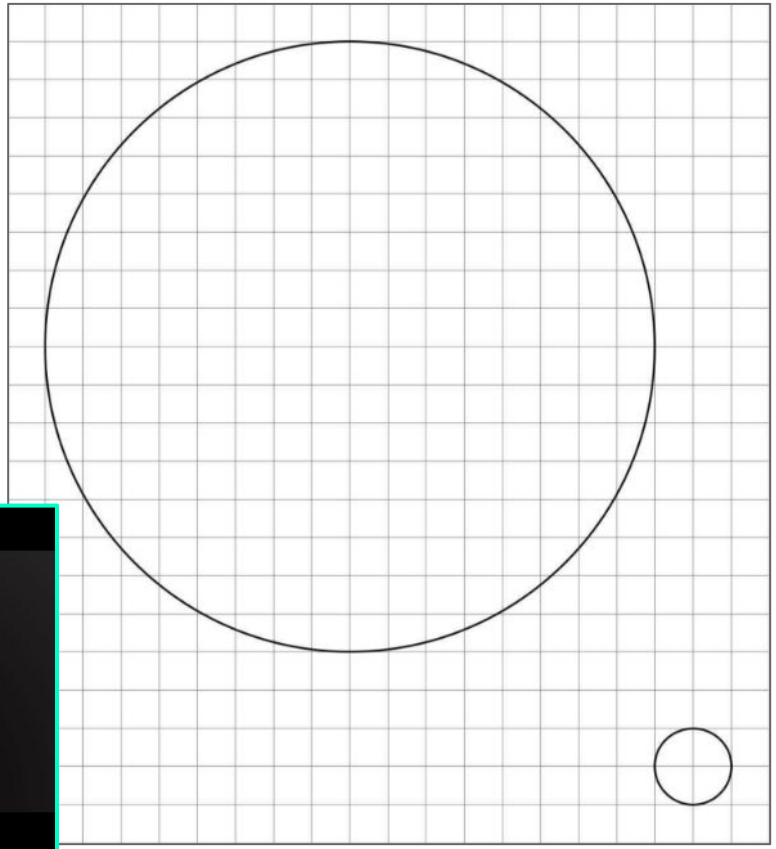
Finding the area of a circle will be the main topic of this lesson!



# Estimating Areas of Circles

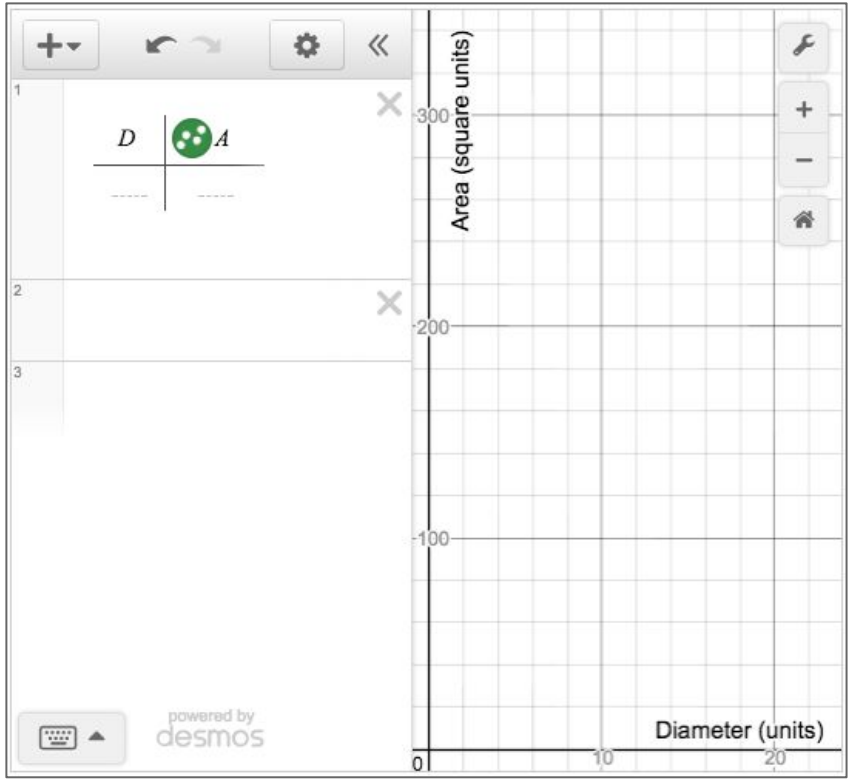
# You will be responsible for estimating the area of 2 circles.

- For each circle, use the squares on the graph to **efficiently** measure the diameter and estimate the area of the circle.
- List the following information for each of your circles:
  - diameter =
  - area =



# Record the Diameter in Column D and the area in column A for your circles.

Unit 3
Lesson 7
Activity 7.2



Is the relationship between the diameter and the area of a circle a proportional relationship?

There **is** a proportional relationship between **diameter and circumference**, even though there's **not** one between **diameter and area**!

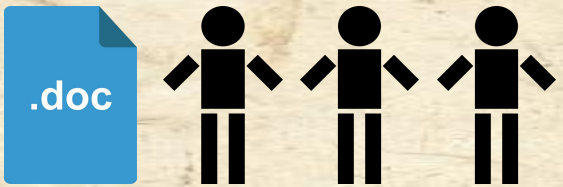
# "Are you ready for more?"

1. How many circles of radius 1 unit can you fit inside a circle of radius 2 units so that they do not overlap?
2. How many circles of radius 1 unit can you fit inside a circle of radius 3 units so that they do not overlap?
3. How many circles of radius 1 unit can you fit inside a circle of radius 4 units so that they do not overlap?

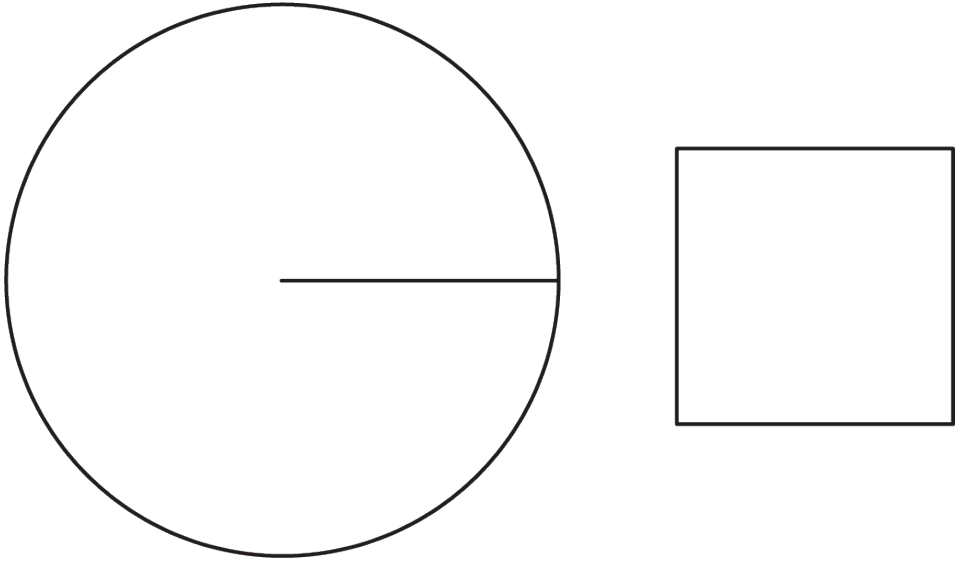
# Covering a Circle

(optional)

**Activity 2**



# Here is a square whose side length is the same as the radius of the circle.

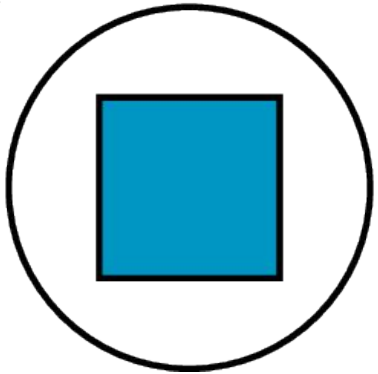
**How many of the squares do you think it would take to cover the circle?**

Can 2 squares completely cover the circle?

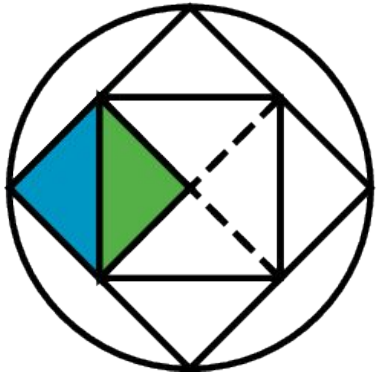
Can 4 squares completely cover the circle?

Can 3 squares completely cover the circle?

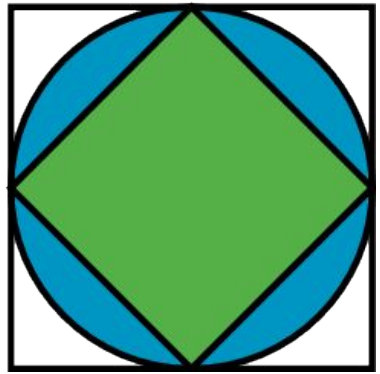
A



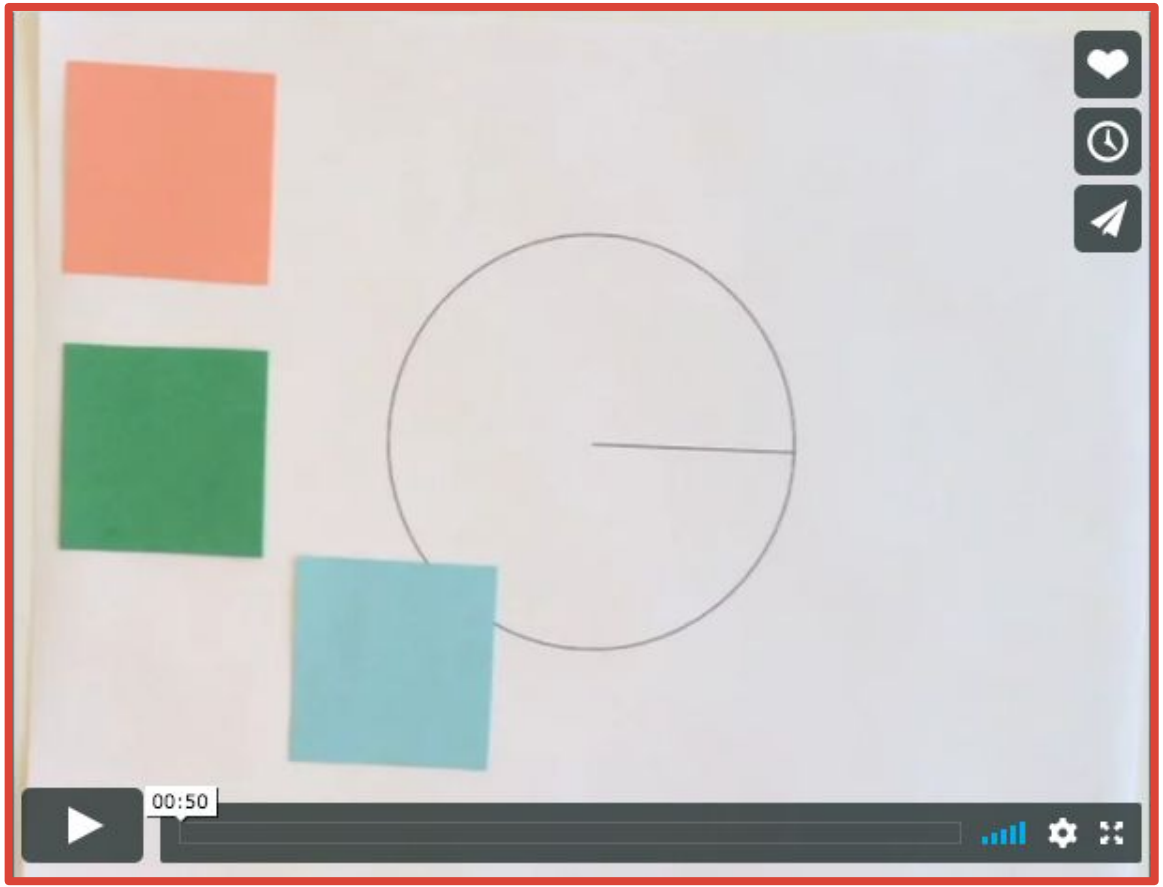
B



C

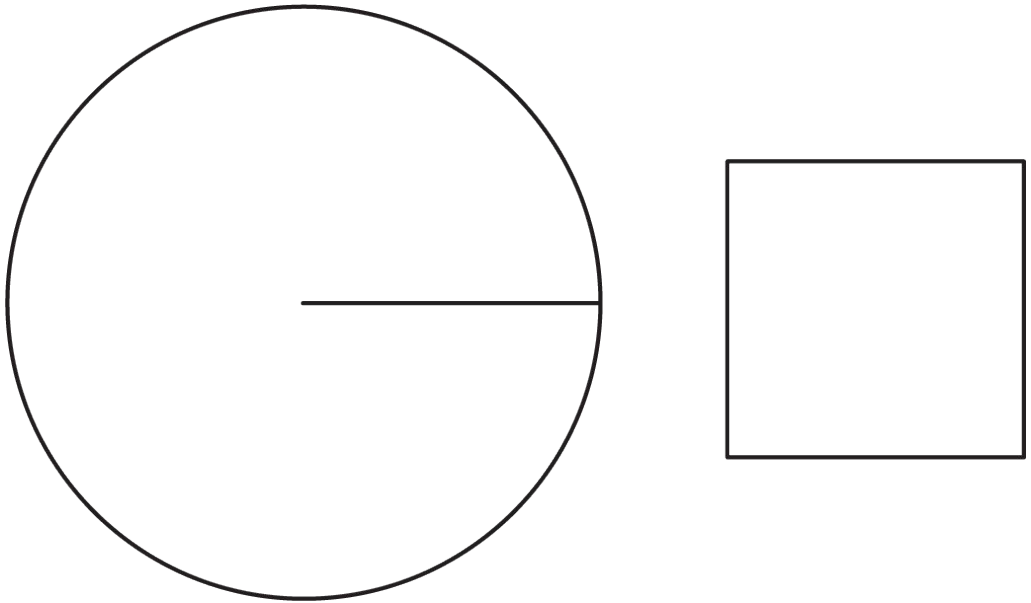


# What do you notice?



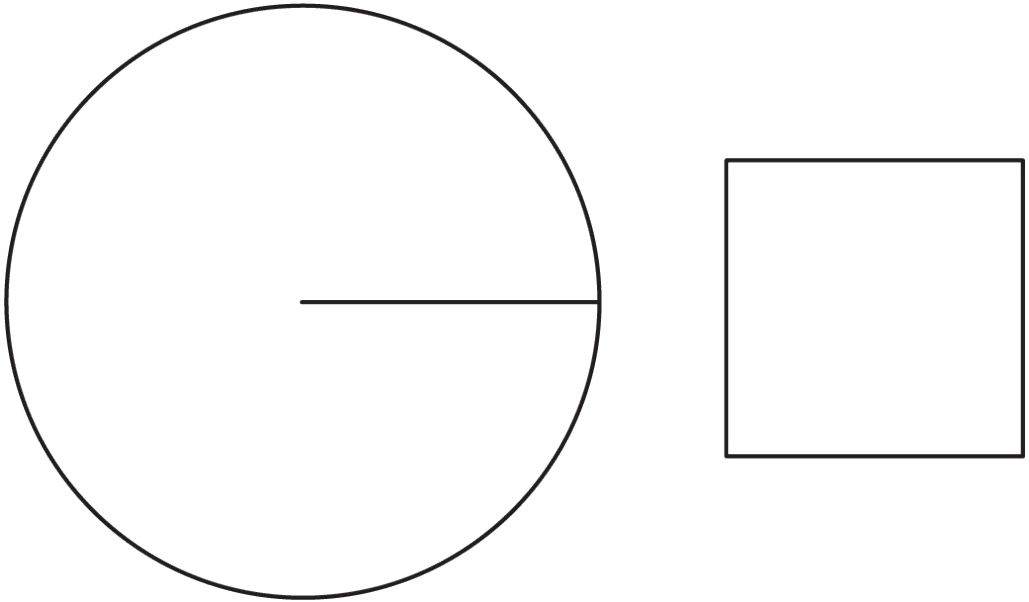

Circle Area Stop Motion from Open Up Resources on Vimeo https://vimeo.com/222585631

Does the size of the circle affect how many radius squares it takes to cover the circle?



No→the entire picture can be scaled.

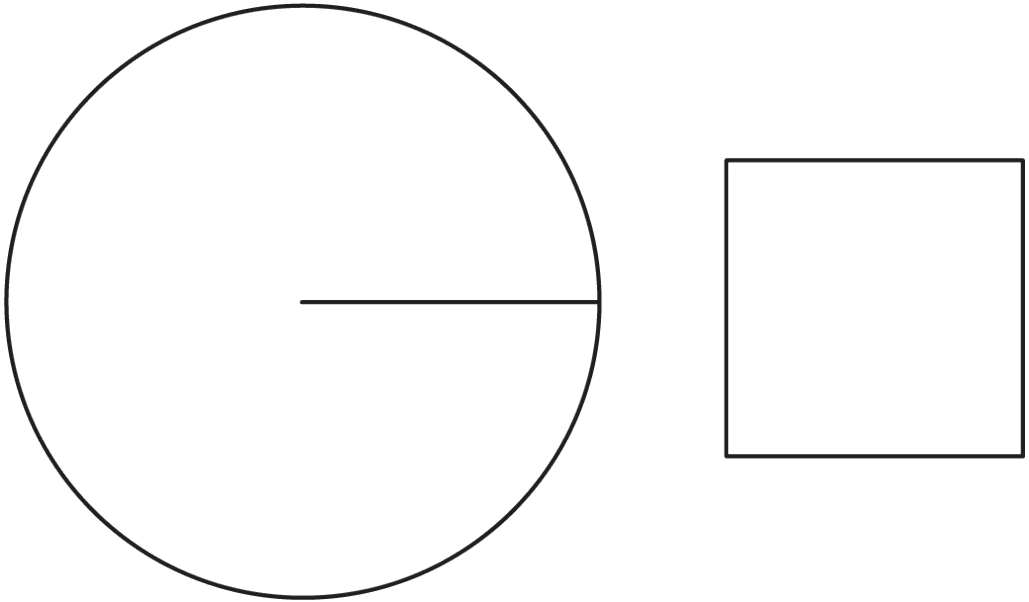
If the radius of the circle were 4 units, what would be the area of the square? What would be the area of the circle?



Area of Square → 4 • 4 = 16 units $^2$

Area of Circle → a little more than 3 • 16, or 48 units $^2$

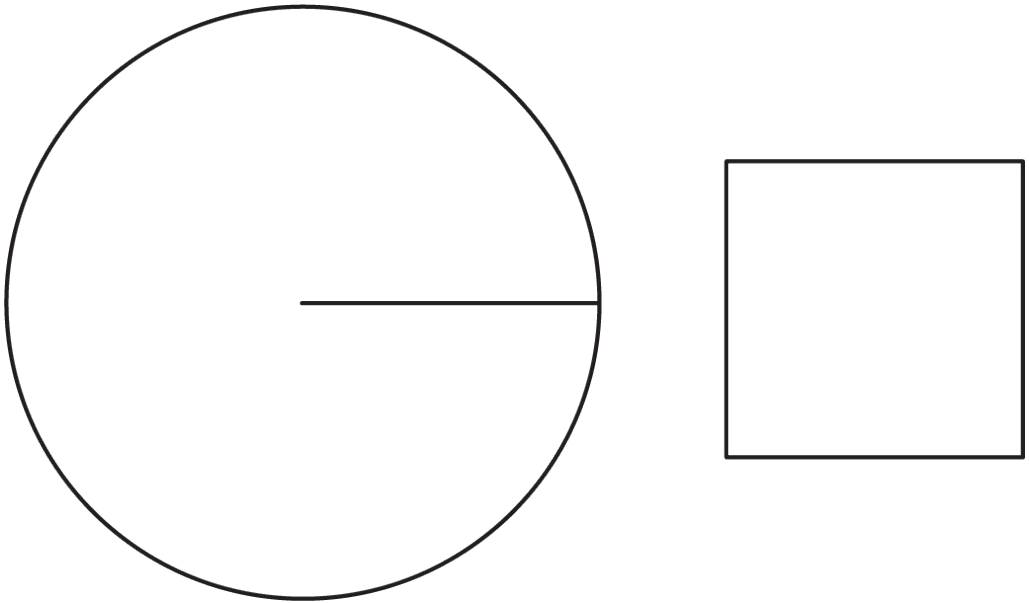
If the radius of the circle were 10 units, what would be the area of the square? What would be the area of the circle?



Area of Square → $10 \cdot 10 = 100$ units $^2$

Area of Circle → a little more than $3 \cdot 100$, or 300 units $^2$

If the circle has radius *r* units, what would be the area of the square? What would be the area of the circle?



Area of Square → $r \cdot r = r^2$ units$^2$

Area of Circle → a little more than $3 \cdot r^2$, or $3r^2$ units$^2$

If you have a square with side lengths equal to the radius of a circle,

**how many of these squares does it take to cover the circle?**

Use the approximation $3.14 \bullet r^2$ to estimate the area of 2 circles shown on the table.

| diameter | area of circle |
| --- | --- |
| 2 cm | |
| 16 cm | |
| 3 cm | |
| 12 cm | |
| 4 cm | |
| 20 cm | |

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# Area of two Circles

**Cool Down**