Unit 3: Measuring Circles

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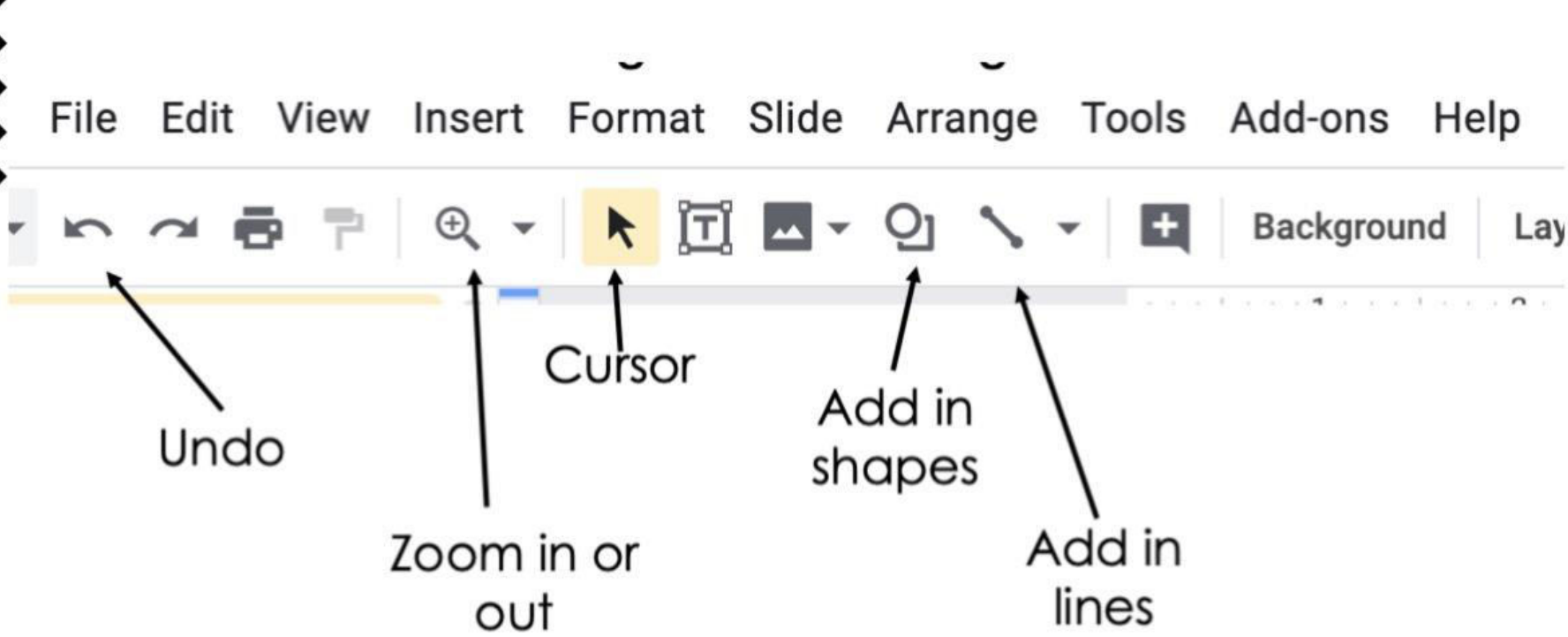
Math – Ms. Yonash

Important Google Tools



Shortcuts

CTRL + C= COPY

CTRL + V= PASTE

CTRL + Z= UNDO

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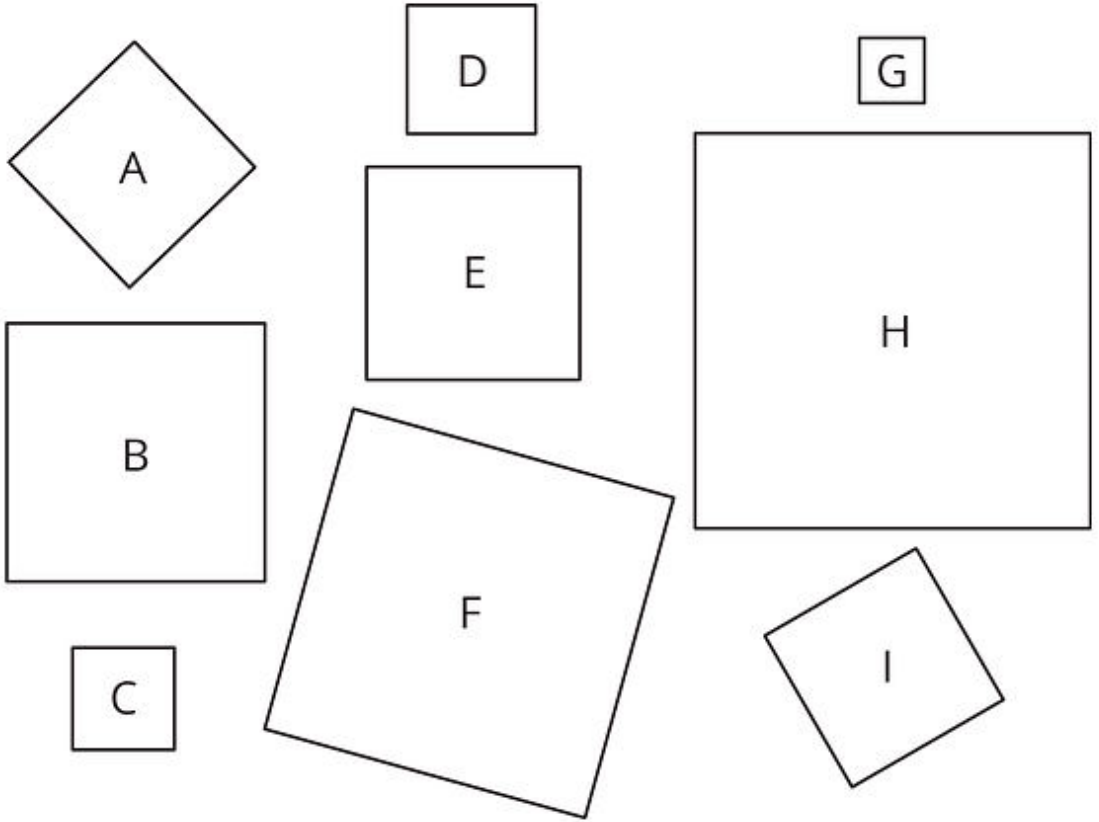
Lesson 1: How well can you measure?

Learning Goals	I understand that it can be difficult to measure the quantities in a proportional relationship accurately. I can examine quotients and use a graph to decide whether two associated quantities are in a proportional relationship.

Lesson 1: How well can you measure?

Lesson 1: Desmos – Activity 1

Desmos lesson and cool down!



Lesson 1: How well can you measure? – SUMMARY

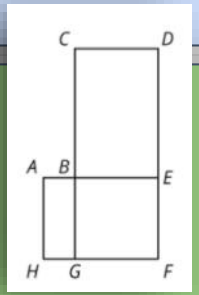
Video Summary

Notes:

Homework/Practice:

Cool down in Desmos

Level 4:



There are 4 mail routes during the week.

- On Monday, the mail truck follows the route A-B-E-F-G-H-A, which is 14 miles long.
- On Tuesday, the mail truck follows the route B-C-D-E-F-G-B, which is 22 miles long.
- On Wednesday, the truck follows the route A-B-C-D-E-F-G-H-A, which is 24 miles long.
- On Thursday, the mail truck follows the route B-E-F-G-B.

How long is the route on Thursdays?

Lesson 2: Exploring Circles

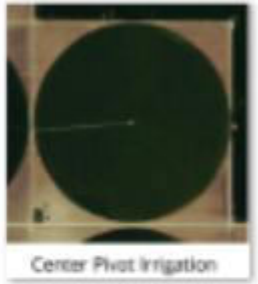
Learning Goals	I can identify the diameter, center, radius, and circumference of a circle.
	I can describe the characteristics that make a shape a circle.

Lesson 2: Sorting Round Objects-- Activity 2

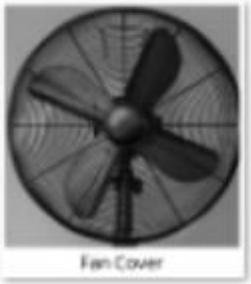
Sorting Round Objects Card Sort

bike wheel

boiled egg



center pivot irrigation



fan cover

glow necklace

grill

Lesson 2: Measuring Circles– Activity 3

Priya, Han, and Mai each measured one of the circular objects from earlier.

- Priya says that the bike wheel is 24 inches.
- Han says that the yo-yo trick is 24 inches.
- Mai says that the glow necklace is 24 inches.

1. Do you think that all these circles are the same size? Answer here

1. What part of the circle did each person measure? Explain your reasoning here

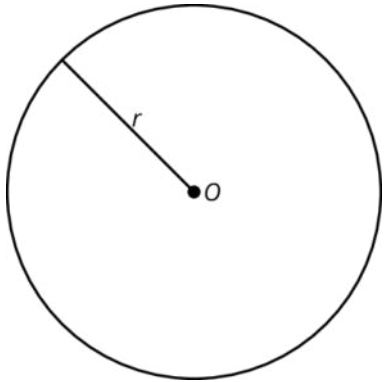
Practice drawing circles in the applet

Draw:

- Circle A with a diameter of 6
- Circle B with a radius of 5cm

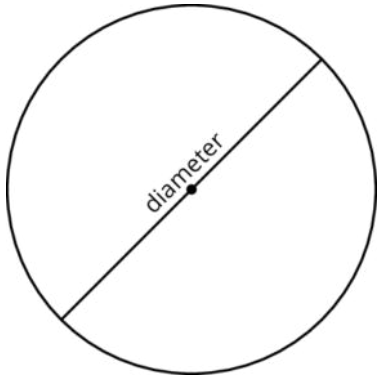
Radius

The distance from the center of a circle to any point on the circle. Also the corresponding line segment from the center to a point on the circle.



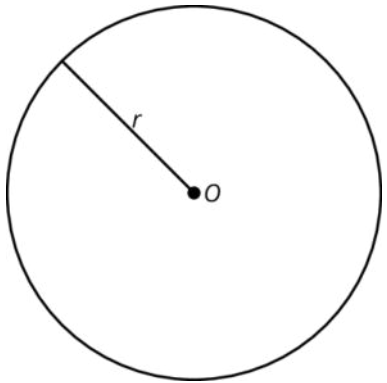
Diameter

A line segment that has endpoints on a circle and passes through the center is called a diameter of the circle. The length of this segment is also called the diameter.



Circumference

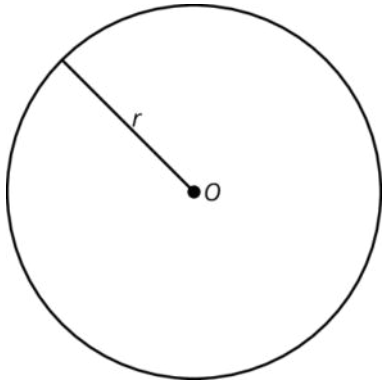
The circumference of a circle is the distance around the circle. If you imagine the circle as a piece of string, it is the length of the string. If the circle has radius r then the circumference is $2\pi r$.



Circle

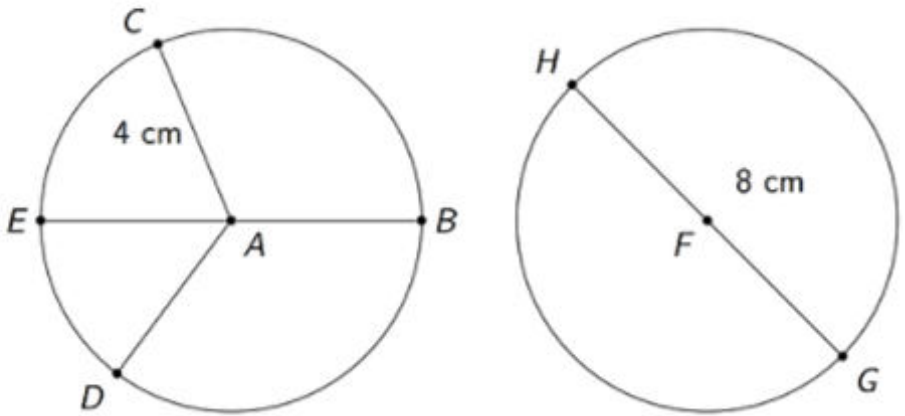
A circle of radius r with center O is the set of all points that are a distance r units from O.

To draw a circle of radius 3 and center O, use a compass to draw all the points at a distance 3 from O.



Lesson 2: Comparing Circles– Cool Down

Here are two circles. Their centers are A and F.



1. What is the same about the two circles? Answer here
1. What is different about the two circles? Answer here
1. What is the length of segment AD? How do you know? Answer here
1. On the first circle, what segment is a diameter? How long is it? Answer here

Lesson 2: Exploring Circles– SUMMARY

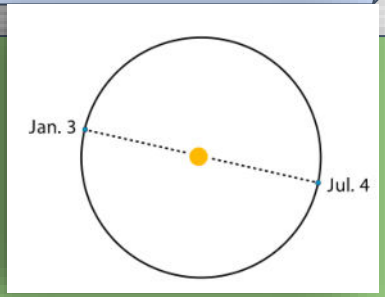
Video Summary

Notes:

Homework/Practice:

Cool down on the previous slide

Level 4:



On January 3rd, the Earth is 147,500,000 kilometers away from the Sun. On July 4th, the Earth is 152,500,000 kilometers away from the Sun. The sun has a radius of about 865,000 kilometers.

Could the Earth's orbit be a circle with some point in the Sun as its center? Explain your reasoning.

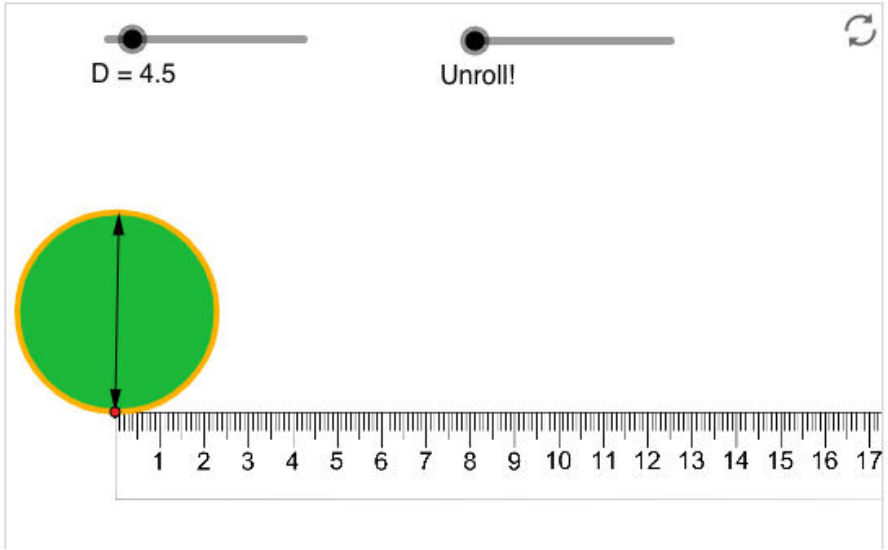
Lesson 3: Exploring Circumference

Learning Goals	I can describe the relationship between circumference and diameter of any circle.
	I can explain what π means.

Lesson 3: Exploring Circumference


Radius
Diameter

Measuring Circumference and Diameter Desmos



Lesson 3: Identifying Circumference and Diameter-- Cool Down Assignment

Video showing the constant of proportionality between the diameter and circumference

Highlight all the pairs that could be reasonable approximations for the diameter and circumference of a circle. Explain your reasoning.

A. 5 meters and 22 meters.
B. 19 inches and 60 inches.
C. 33 centimeters and 80 centimeters.

Lesson 3: Exploring Circumference– SUMMARY

Video Summary

Notes:

Homework/Practice:

-Cool down on previous slide
-Finish Desmos

Level 4:

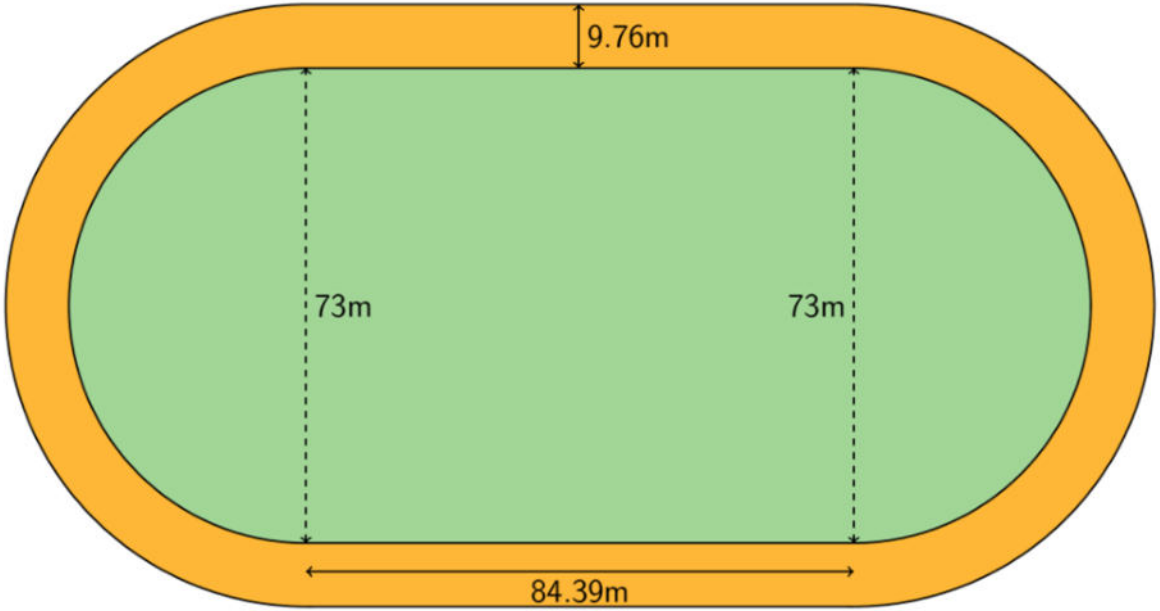
Suppose you had another circular object with a diameter that is half as long as the diameter of your largest circle. What would its circumference be?

Lesson 4: Applying Circumference

Learning Goals	I can choose an approximation for π based on the situation or problem.
	If I know the radius, diameter, or circumference of a circle, I can find the other two.

Lesson 4: Applying Circumference

Lesson 4 Desmos



Lesson 4: -- Cool Down Assignment

$$C = 3.14d$$

Circle A has a diameter of 9 cm. Circle B has a radius of 5 cm.

1. Which circle has the larger circumference? Answer here

1. About how many centimeters larger is it? Answer here

Lesson 4: Applying Circumference – SUMMARY

Video Summary

Homework/Practice:

Cool down on previous slide

Notes:

Level 4:

This size running track is usually called a 400-meter track. However, if a person ran as close to the "inside" as possible on the track, they would run less than 400 meters in one lap. How far away from the inside border would someone have to run to make one lap equal exactly 400 meters?

Note Sheet

Learning Goals	I can take notes on circles and circumference

Note Sheet

Quiz

Learning Goals	I can solve my knowledge of circle concepts from lessons 1-4

Quiz

Lesson 5: Circumference and Wheels Optional

Learning Goals	If I know the radius or diameter of a wheel, I can find the distance the wheel travels in some number of revolutions.

Lesson 5: Circumference and Wheels Optional

Lesson 5: Optional Rotations and Distance-- Activity 3

1. A car wheel has a **diameter** of 20.8 inches.

    a. About how far does the car wheel travel in:
        - 1 rotation? Answer here
        - 5 rotations? Answer here
        - 30 rotations? Answer here

    a. Write an equation relating the distance the car travels in inches, c, to the number of wheel rotations, x. Answer here

    a. About how many rotations does the car wheel make when the car travels 1 mile? Explain or show your reasoning here

Lesson 5: Optional Rotations and Distance-- Activity 3 Continued

1. A bike wheel has a **radius** of 13 inches.

   a. About how far does the bike wheel travel in
      - 1 rotation? Answer here
      - 5 rotations? Answer here
      - 30 rotations? Answer here

   a. Write an equation relating the distance the bike travels in inches, *b*, to the number of wheel rotations, *x*. Answer here

   a. About how many rotations does the bike wheel make when the bike travels 1 mile? Explain or show your reasoning here.

Lesson 5: Optional-- Cool Down Assignment

The wheels on Noah's bike have a circumference of about 5 feet.

1. How far does the bike travel as the wheel makes 15 complete rotations? Answer here
2. How many times do the wheels rotate if Noah rides 40 feet? Answer here

Lesson 5: Circumference and Wheels Optional– SUMMARY

Video Summary

Notes:

Homework/Practice:

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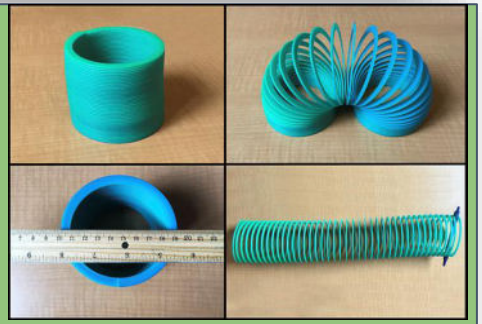
Optional Khan Quiz

Level 4:



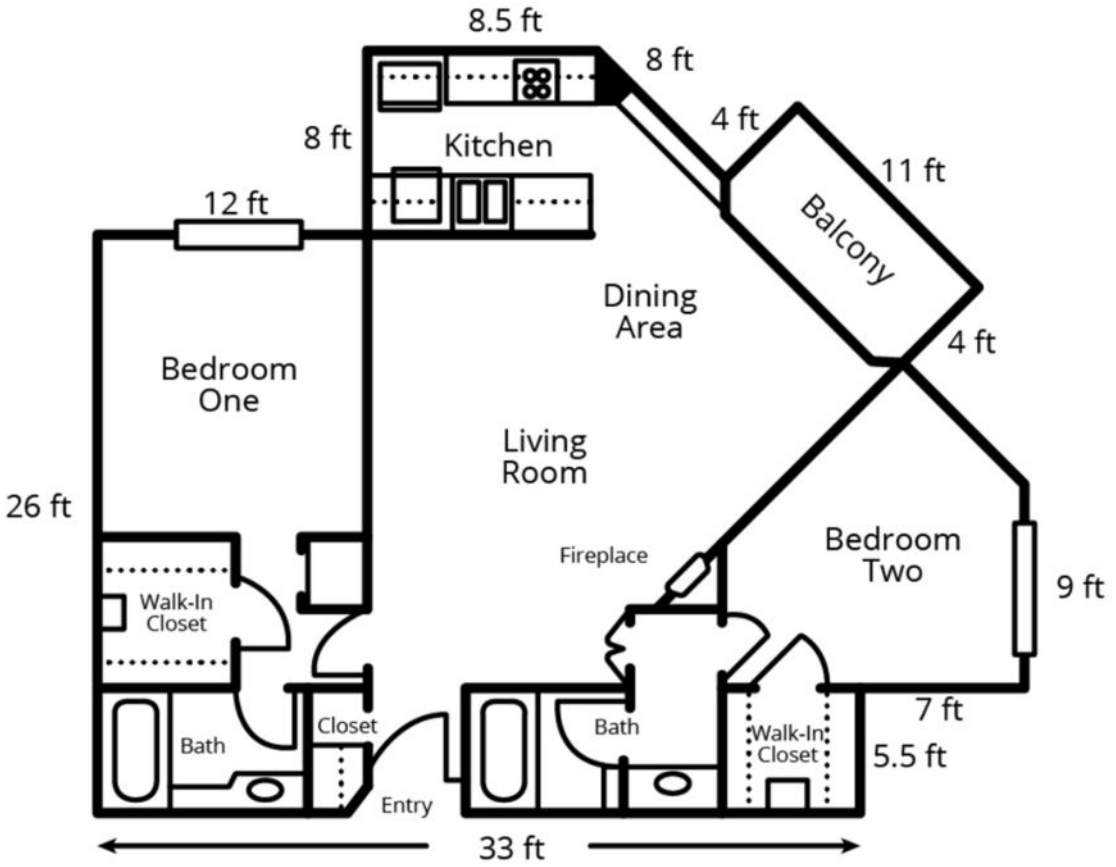
If you could stretch out the spring completely straight, how long would it be? Explain or show your reasoning.

Lesson 6: Estimating Area

Learning Goals	I can calculate the area of a complicated shape by breaking it into shapes whose area I know how to calculate.

Lesson 6: House Floor Plan-- Activity 2

Kami activity (find the link posted in Google Classroom today)

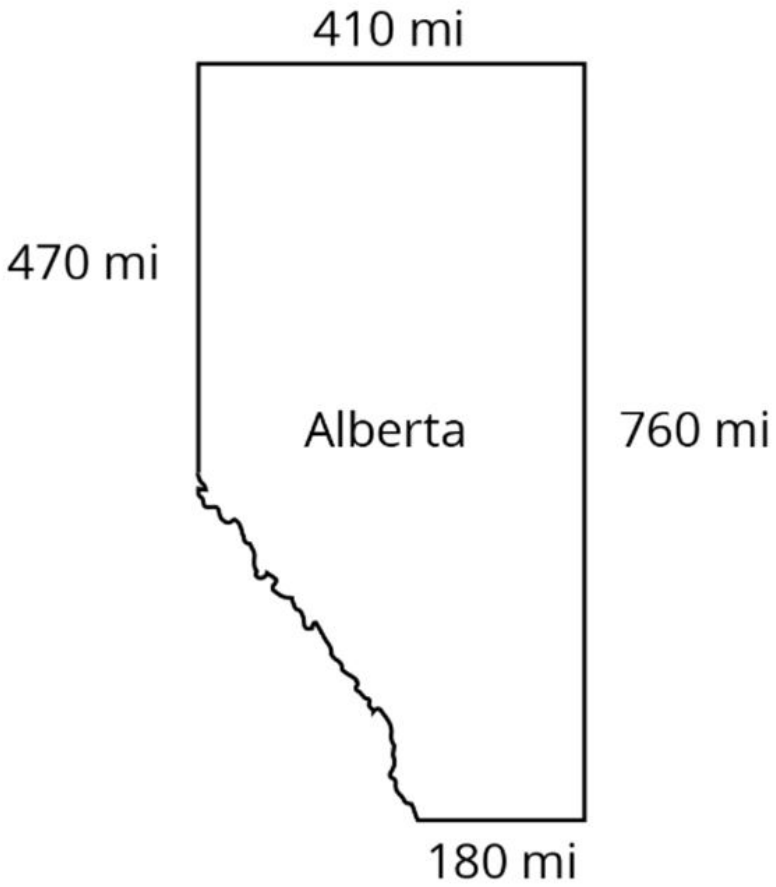


Lesson 6: Area of Nevada-- Activity 3

Estimate the area of Nevada in square miles.
Explain or show your reasoning here

Lesson 6: The Area of Alberta -- Cool Down Assignment

Estimate the area of Alberta in square miles.
Explain or show your reasoning here



Lesson 6: Estimating Area– SUMMARY

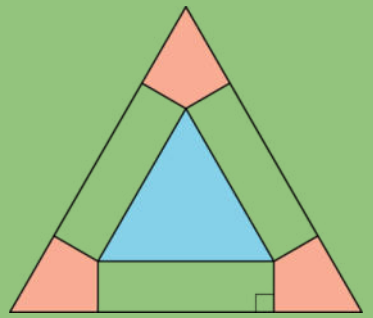
Video Summary

Homework/Practice:

Cool down on previous slide

Notes:

Level 4:



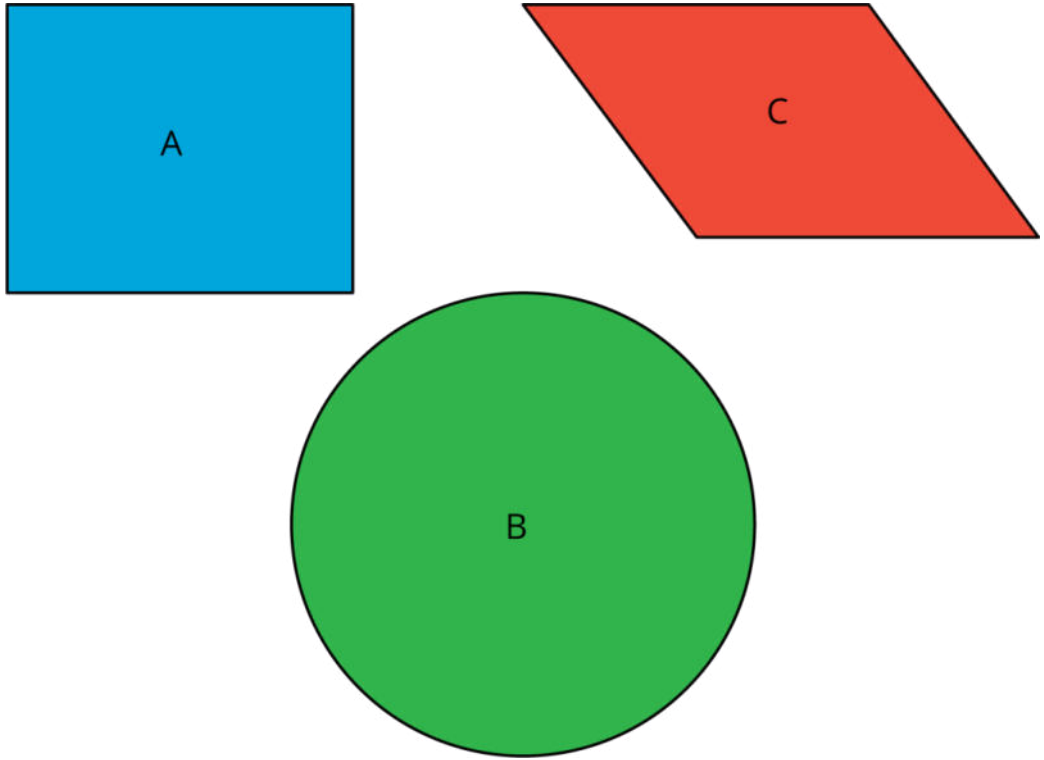
The two triangles are equilateral, and the three pink regions are identical. The blue equilateral triangle has the same area as the three pink regions taken together. What is the ratio of the sides of the two equilateral triangles?

Lesson 7: Exploring the Area of a Circle

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

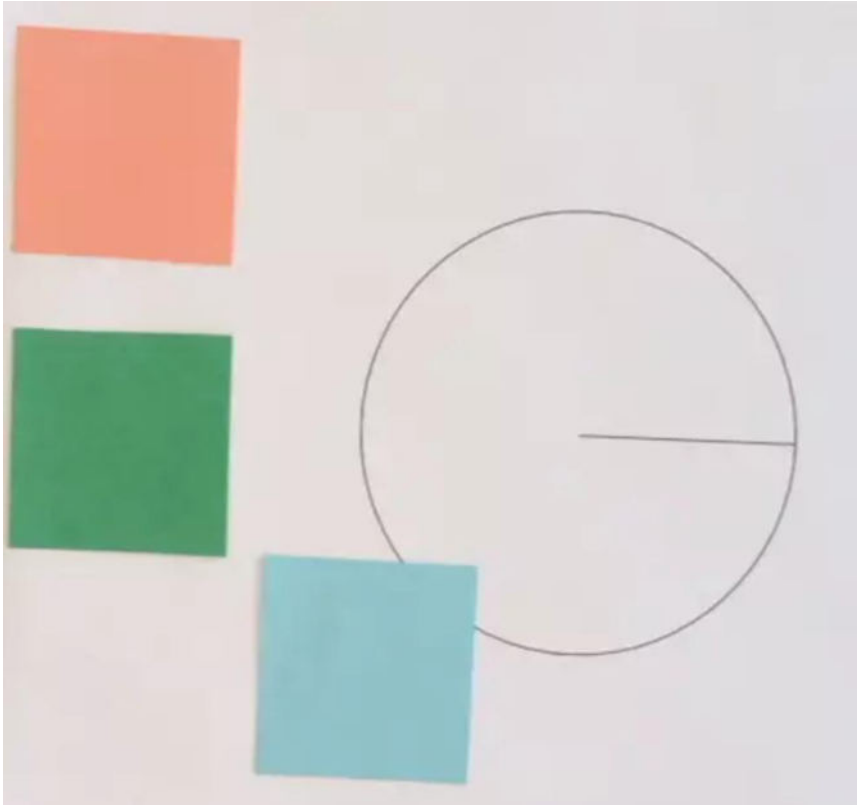
Lesson 7: Estimating Areas of Circles– Activity 2

Estimating area of circles Desmos



Lesson 7: Covering a Circle- Activity 3

Click on the image to view a video on covering a circle to find the area.



AREA OF A CIRCLE

$$A = \pi r^2$$

Lesson 7: Area of Two Circles -- Cool Down Assignment

- Circle A has a diameter of approximately 20 inches and an area of approximately 300 in^2.
- Circle B has a diameter of approximately 60 inches.

Highlight which of these could be the area of Circle B? Explain your reasoning here

A. About 100 in^2
B. About 300 in^2
C. About 900 in^2
D. About 2,700 in^2

Lesson 7: Exploring Area of a Circle– SUMMARY

Video Summary

Notes:

Homework/Practice:

Cool Down on previous slide

Level 4:

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?

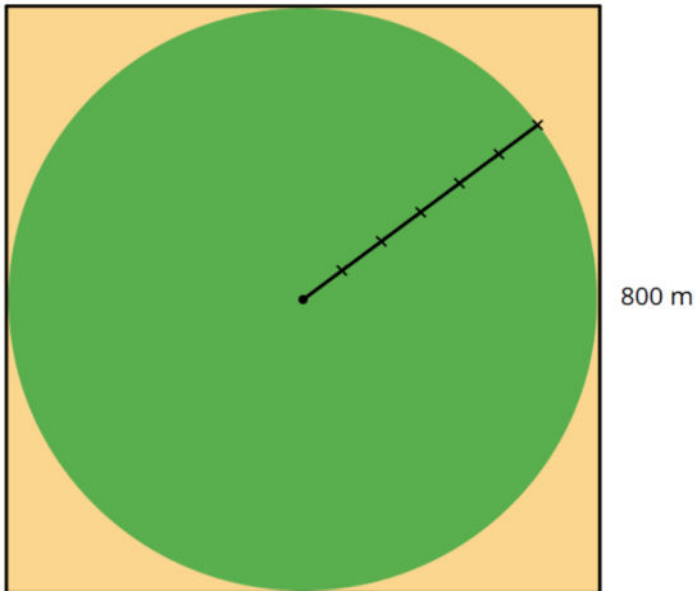
If you get stuck, consider using coins or other circular objects.

Lesson 8: Relating Area to Circumference

Learning Goals	I can explain how the area of a circle and its circumference are related to each other. I know the formula for area of a circle.

Lesson 8 Activity 1: Irrigating a Field

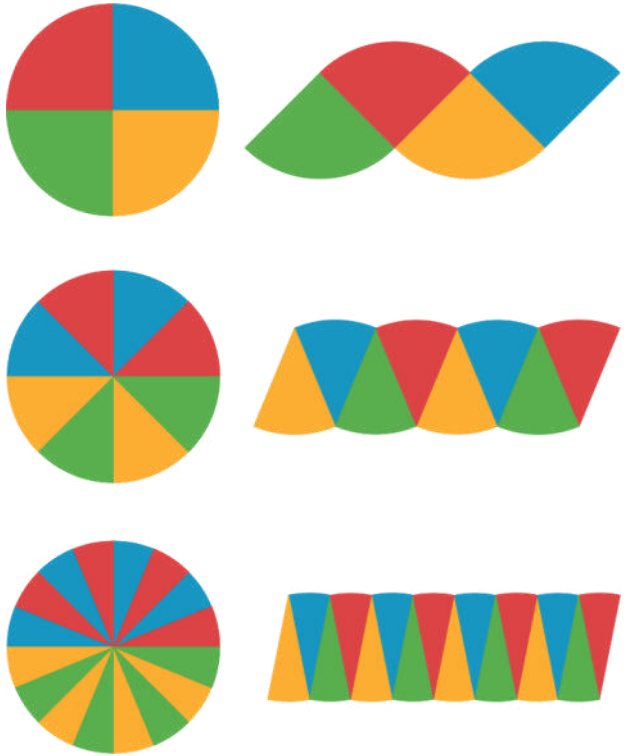
A circular field is set into a square with an 800m side length. Estimate the field's area (highlight).



A. About 5,000 m^2
B. About 50,000 m^2
C. About 500,000 m^2
D. About 5,000,000 m^2
E. About 50,000,000 m^2

Lesson 8: – Activity 2

Click on the picture to go to the applet that shows you one way to find the area formula of a circle.



Lesson 8: – Activity 3

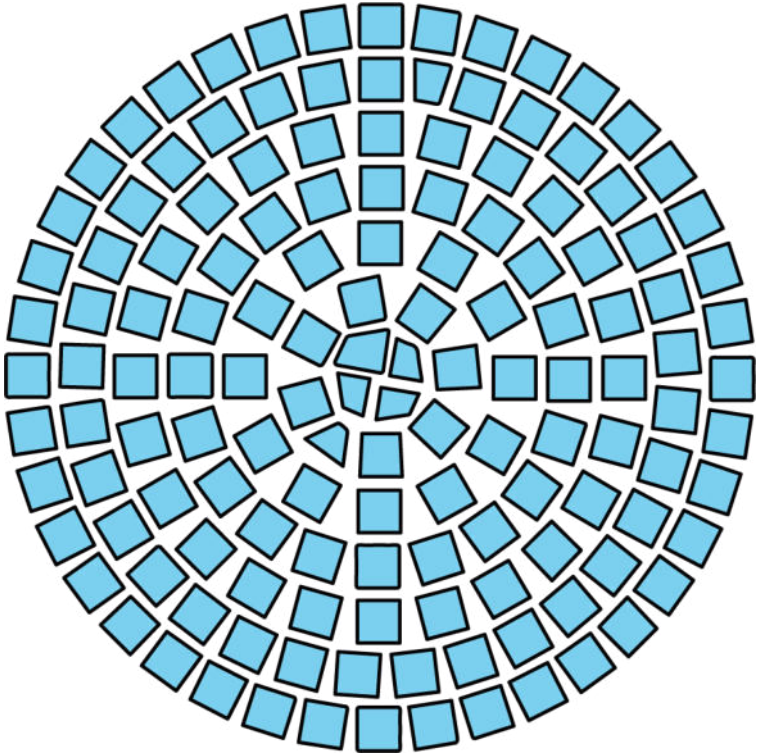
Click on the picture to go to the video that shows you another way to find the area formula of a circle, but this time using a triangle.

- Area $= \frac{1}{2} \cdot$ base $\cdot$ height
- Area $= \frac{1}{2} \cdot$ circumference $\cdot$ radius
- Area $= \frac{1}{2} \cdot (\pi d) \cdot r$
- Area $= \pi r \cdot r$
- Area $= \pi r^2$

Lesson 8: Tiling a Table -- Activity 4

Elena wants to tile the top of a circular table. The diameter of the table top is 28 inches.

What is its area? Answer here



Lesson 8: – SUMMARY

Video Summary

Homework/Practice:

Cool Down on the previous slide

Notes:

Level 4:

A box contains 20 square tiles that are 2 inches on each side. How many boxes of tiles will Elena need to tile the table?

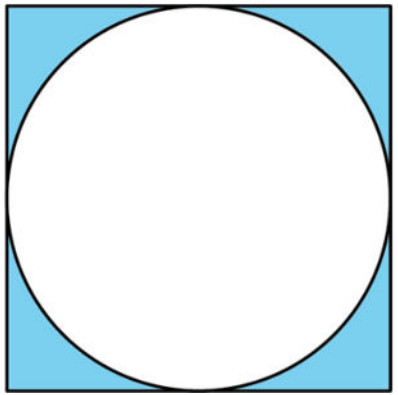
Lesson 9: Applying Area of Circles

Learning Goals	I can write exact answers in terms of π.
	I can calculate the area of more complicated shapes that include fractions of circles.

Lesson 9: Applying Area- Activity 1-3

Lesson 9 Desmos

A



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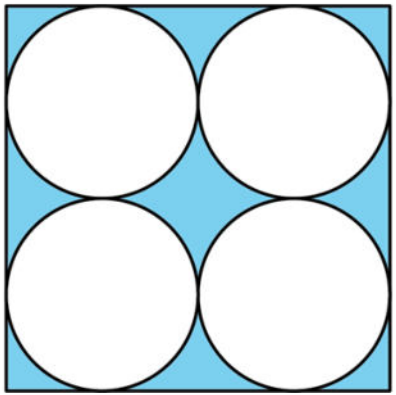

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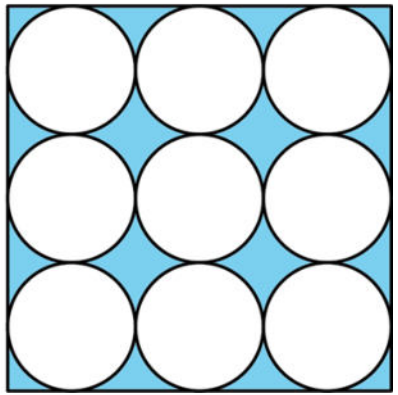
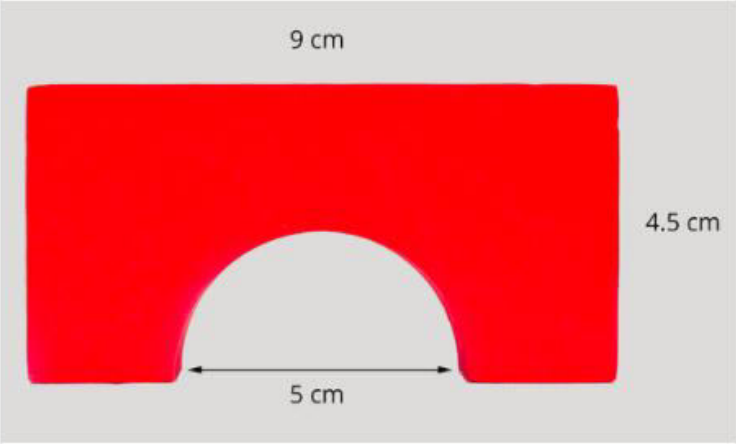


Lesson 9: Applying Area– Activity 1-3

Here is a picture that shows one side of a child's wooden block with a semicircle cut out at the bottom.



Find the area of the side. Explain or show your reasoning here.

Lesson 9: Applying Area of Circles– SUMMARY

Video Summary

Homework/Practice:

Cool Down on previous slide

Notes:

Level 4:

Which figure in Activity 2 has a longer perimeter, Figure D or Figure E? How much longer?

Unit 3: Circles Resources

- Area of Parallelograms
- Area of Triangles

- How well can you measure?: Lesson 1 Video Summary
- Exploring Circumference Lesson 3 Video Summary
- Applying Circumference: Lesson 4 Video Summary
- Estimating Area: Lesson 6 Video Summary

Khan Academy Practice Test

Kahoot Review Game

Study Guide Paper Packet