



Geometry Journey Video Series

Program #8

Circles

**Satellite Broadcasting
VHS
and Internet/Intranet Streaming**



Topic

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Geometry Journey Series

Program #8 - Circles

Program Description

The circle is as indispensable to man as it is to nature. Every wheel that moves, every gear that turns exploits the geometrical properties of the circle. This video can not only help students master the unique properties of circles, but also help them digest the beginning concept of calculus, thus building a good foundation for future advanced studies.

This program is the #8 episode in the fifteen 15-minute Geometry Journey Series.

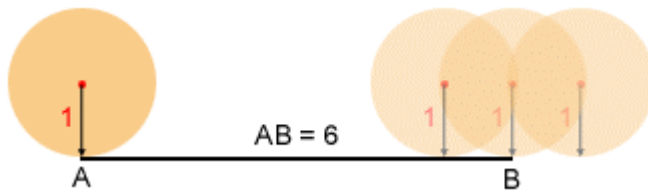
Synopsis

This program will cover the following topics:

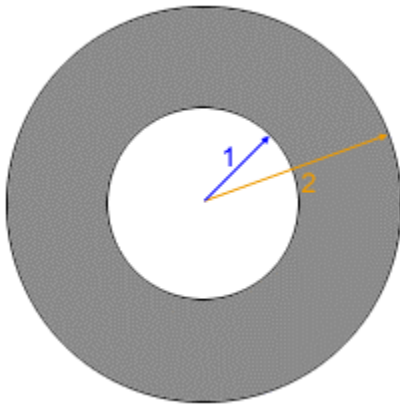
1. Introduction to Circles
2. Radius, Diameter, and Chord
3. Locating the Center of a Circle
4. Circumference and Circumference/Diameter Ratio
5. Area of a Circle
6. Central Angles and Arc
7. Inscribed Angles
8. Concentric Circles
9. Tangents to a Circle

1) Is a diameter a chord? Yes ___ No ___ Is a radius a chord? Yes ___ No ___

2) Rotating a circle whose radius is 1 for a complete turn around its center along a straight line AB without slipping. The length of AB is 6. Will the center of the circle pass the point B?



3) Find the area between the two concentric circles with radius 1 and 2, respectively.



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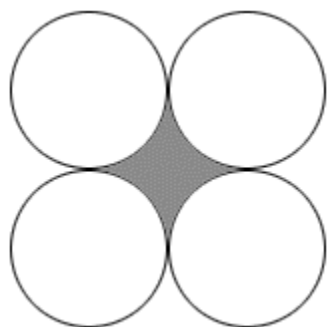
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Discussion Questions

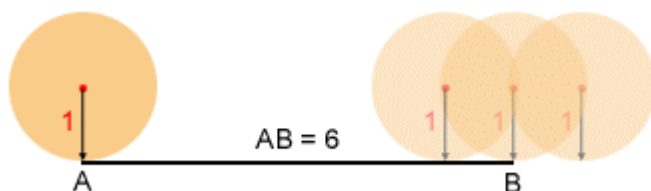
Question: What is the area of the shaded region? The four circles shown in the figure are all congruent and have a radius of r .



1) Is a diameter a chord? Yes x No ___ Is a radius a chord? Yes ___ No x

Answer: A chord is a line segment whose endpoints lie on the circle. Because a diameter is a segment that passes through the center and has its endpoints on the circle, it is a chord (longest chord in a given circle). A radius of a circle is a line segment joining the center of the circle to any point on the circle. Because a radius does not have both endpoints on the circle, it is not a chord.

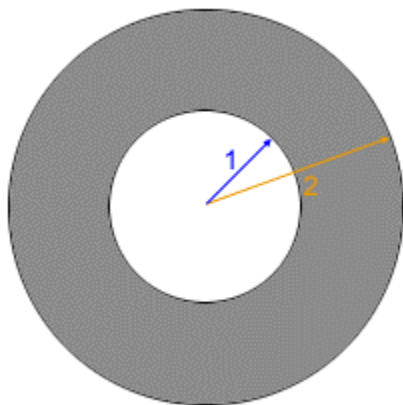
2) Rotating a circle whose radius is 1 for a complete turn around its center along a straight line AB without slipping. The length of AB is 6. Will the center of the circle pass the point B?



Answer: The length the circle travels is equal to the circumference, which is 2π .

Since $2\pi r = 2 \times 3.14 \times 1 = 6.28$ which is larger than AB, the center of the circle will pass the point B after a complete rotation.

3) Find the area between the two concentric circles with radius 1 and 2, respectively.

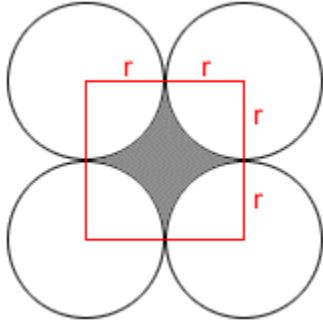


Answer: The area between the two concentric circles is equal to the difference between the areas of the two circles. Therefore, it is equal to

$$\pi 2^2 - \pi 1^2 = 3\pi = 9.42$$

Hints to Discussion Questions

Question: What is the area of the shaded region? The four circles shown in the figure are all congruent and have a radius of r .



Hints: The area of the shaded region is the difference between the area of the square formed by the four centers of the circles and 4 times the area of quarter of a circle, that is,

$$(2r)^2 - 4 \left[\left(\frac{1}{4} \right) \pi r^2 \right] = 4r^2 - \pi r^2$$