Important Concepts . . .

Preview Review

Mathematics Grade 7 TEACHER KEY

W3 - Lesson 1: Circles

Important Concepts of Grade 7 Mathematics

W1 - Lesson 1 .....Divisibility Rules
W1 - Lesson 2 ..... Decimal Numbers
W1 - Lesson 3 .....Fractions
W1 - Lesson 4 ..... Improper Fractions, Mixed Numbers,Percents, and Decimals
W1 - Lesson 5 .....Integers, Number Lines, and Sequencing
W1 - Quiz

W2 - Lesson 1 ..... Table of Values and Graphing Linear Equations
W2 - Lesson 2 .....Modeling Expressions, Equations, and the Preservation of Equality
W2 - Lesson 3 ..... Algebra and Linear Equations
W2 - Lesson 4 .....Statistics
W2 - Lesson 5 ..... Circle Graphs and Calculating Probability
W2 - Quiz

W3 - Lesson 1 ..... Circles
W3 - Lesson 2 ..... Area of Triangles and Parallelograms
W3 - Lesson 3 .....Line Segments
W3 - Lesson 4 ..... Parts and Plotting on a Cartesian Plane
W3 - Lesson 5 .....Transformations
W3 - Quiz

Materials Required

Math Set
Calculator

No Textbook Required

This is a stand-alone course.

Mathematics Grade 7
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Preview/Review W3 - Lesson 3
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Preview/Review Concepts for Grade Seven Mathematics

Teacher Key

W3 – Lesson 1:

Circles

Introductory Information for Teachers

Preview/Review courses are aimed mainly at students who have completed the regular course but who need to review some of the material before beginning the next grade. Other students may find Preview/Review courses useful in preparing for the new concepts they will study in their next grade.

No Preview/Review course is intended to replace the regular course because each covers only what the writers have decided are the top 15 concepts from the Program of Studies for that course.

Preview/Review materials are intended for use by teachers and students in one-subject and one-grade classrooms. This Preview/Review course contains fifteen lessons in three sections. Each section has five lessons. A short quiz is provided at the end of each section to test student knowledge of the material studied. In a classroom the course will likely be completed in three weeks.

This Preview/Review course is written to be stand-alone. There is no textbook required.

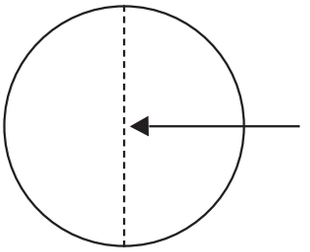
W3 – Lesson 1: Circles

Objective:

- *I can show that the diameter of a circle is twice the radius of a circle.*

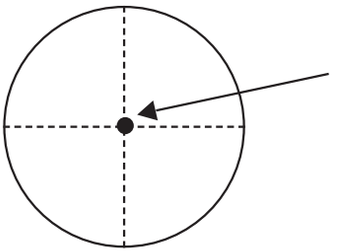
Parts of a Circle

Take a circle and fold it in half. The line segment created by the fold is the diameter of the circle.



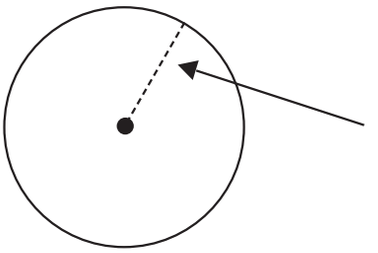
A line segment reaching the edges of a circle and passing through the center is the **diameter**.

Fold the circle in half again. The point where the two line segments cross is the center point of the circle.



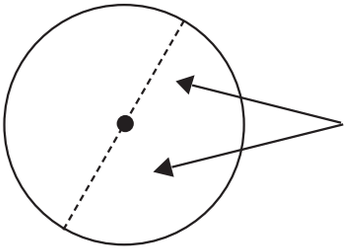
Where two diameters intersect, or cross, is the **center point.**

A line segment from the center point to the edge is the radius.



A line segment from the center point to the edge of the circle is the **radius**.

Put two radii in a straight line and it is the same length as the diameter.



diameter = 2 × radius

or

radius = diameter ÷ 2

Example: A giant Ferris wheel has spokes from the center measuring 20m. How wide across is the Ferris wheel?

The widest point of the wheel is the diameter.

Diameter = 2(radius)
= 2(20)
= 40m

Practice:

1. Calculate the radius.

   a. Diameter = 42cm

   r = 21 cm

   b. Diameter = 12m

   r = 6 m

   c Diameter = 38mm

   r = 19 mm

   d. Diameter = 2 km

   r = 1 km

2. Calculate the diameter.

   a. Radius = 6cm

   d = 12 cm

   b. Radius = 14mm

   d = 28 mm

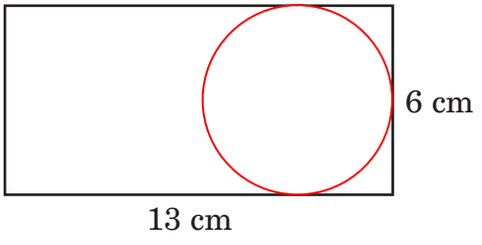
   b. Radius = 2 km

   d = 4 km

   d. Radius = 7m

   d = 14 m

3. What is the diameter and radius of the largest circle that will fit in the rectangle?



Diameter = 6 cm

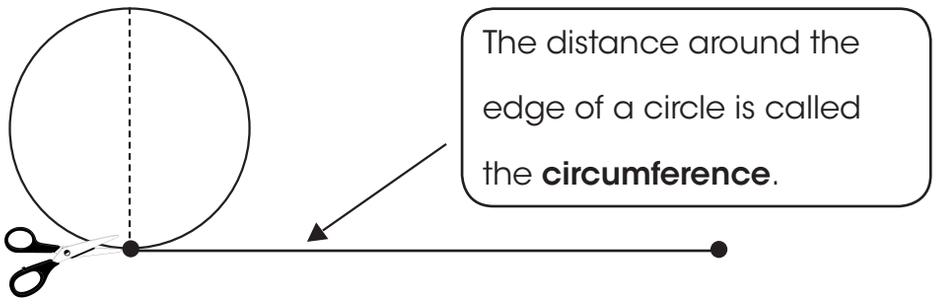
Radius = 3 cm

Objective:

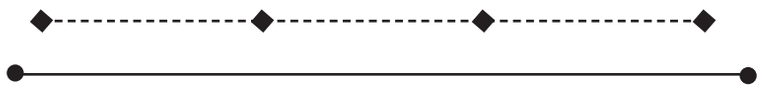
- *I can show that the circumference of a circle is approximately three times the diameter.*

Circumference of a circle

Cut a circle and stretch it flat. The resulting line is the circumference of the circle.



If we compare the length of the diameter to the length of the circumference we'll see it is always about 3 diameter lengths to 1 circumference length.

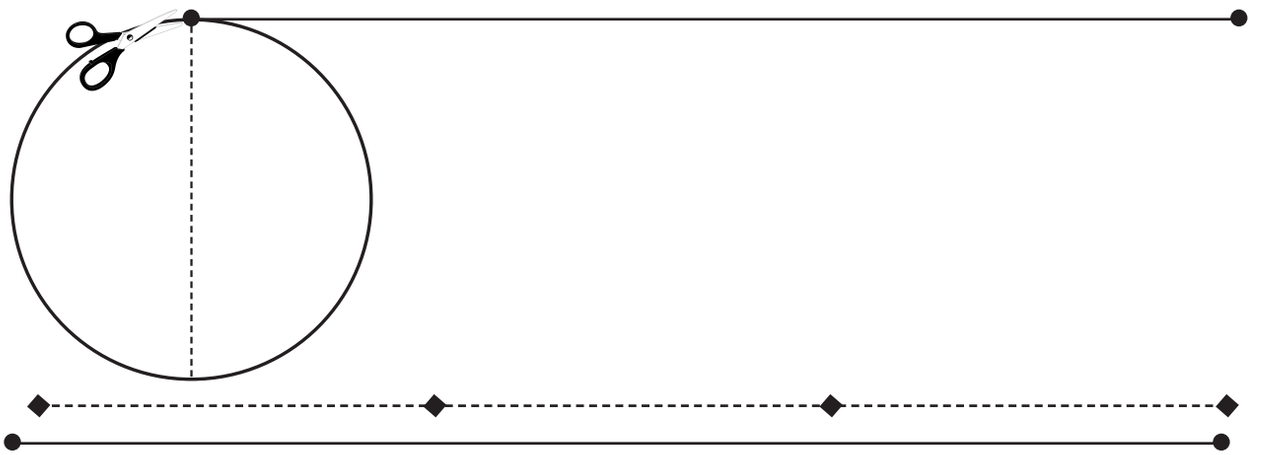


3 diameters ≈
1 circumference

This is true no matter the size of the circles.

It's true for small circles:

It's true for large circles:



Pi (π)

The ratio of circumference to diameter is represented by the Greek letter Pi (π).

π can be used to calculate circumference from the diameter (or diameter from the circumference).

Pi (π) is an irrational number equal to about 3.14

Circumference = π × diameter

Or **$C = \pi d$**

Also: **Diameter = Circumference ÷ π**

Or **$d = C/\pi$**

Example: The radius of a circle is 6cm, what is the circumference?

=Diameter = 2(radius)
= 2(6)
= 12cm

Circumference = π(diameter)
= 3.14(12)
= 37.7cm

Example 2: A piece of candy is stuck on a wheel leaving a sticky spot on the floor whenever it touches. If the sticky spots are about 95 cm apart, what is the diameter of the wheel?

The distance the candy has to go before it touches the ground again is equal to the circumference.

Diameter = Circumference/π
= 95/3.14
= 30 cm
The wheel had a 30cm diameter.

Practice:

1. Calculate circumference if:

   a. Radius = 3cm

   C = 2(3)(3.14)
   = 18.8 cm

   b. Radius = 4m

   C = 2(4)(3.14)
   = 25.1 m

   c. Diameter = 20mm

   C = 20(3.14)
   = 62.8 mm

   d. Diameter = 7km

   C = 7(3.14)
   = 22 km

2. Calculate diameter if:

   a. Circumference = 47cm

   d = 47/3.14
   = 15 cm

   b. Circumference = 9.5 m

   d = 9.5/3.14
   = 3 m

   c. Circumference = 38 mm

   d = 38/3.14
   = 12 mm

   d. Circumference = 3 km

   d = 3/3.14
   = 1 km

3. Calculate radius if:

   a. Circumference = 69mm

   $r = 69(\frac{1}{2})/3.14$
   = 11 mm

   b. Circumference = 25 cm

   $r = 25(\frac{1}{2})/3.14$
   = 4 cm

   c. Circumference = 13km

   $r = 13(\frac{1}{2})/3.14$
   = 2 km

   d. Circumference = 31 m

   $r = 25(\frac{1}{2})/3.14$
   = 5 m

Summary and Practice:

- *Using what you've learned, answer the following questions*

Fill in the blanks.

1. The point where two diameters intersect is called the ***center*** ***point***.

   a. ***Pi*** is an irrational number approximately equal to 3.14.

   b. ***Circumference*** = 2(radius)(3.14)

   c. ***Radius*** = diameter ÷ 2

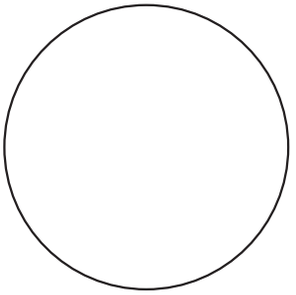
   d. ***Diameter*** = circumference ÷ π

2. Complete the chart.

Radius	***Diameter***	***Circumference***
4 cm	***8 cm***	***25.1 cm***
15 m	30 m	***94.2 m***
1 m	***2 m***	6.28 mm
6 km	12 km	***37.7 km***
9 cm	***18 cm***	***56.5 cm***
50 mm	***100 mm***	314 mm

3. For each circle, measure the diameter, and then calculate the radius and circumference.

a.

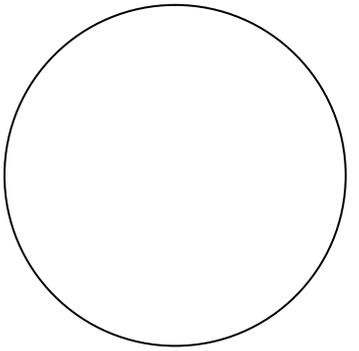


Diameter: ***38 mm***

Radius: ***19 mm***

Circumference: ***119.3 mm***

b.

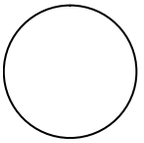


Diameter: ***46 mm***

Radius: ***23 mm***

Circumference: ***144.4 mm***

c.

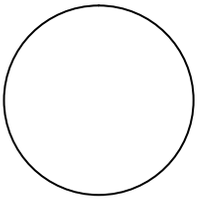


Diameter: ***18 mm***

Radius: ***9 mm***

Circumference: ***56.5 mm***

d.



Diameter: ***25 mm***

Radius: ***12.5 mm***

Circumference: ***78.5 mm***

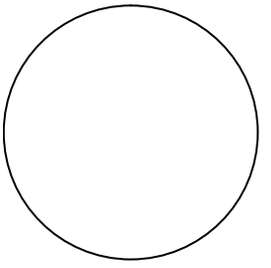
e.

Diameter: ***10 mm***

Radius: ***5 mm***

Circumference: ***31.4 mm***

f.



Diameter: ***34 mm***

Radius: ***17 mm***

Circumference: ***106.8 mm***

4. The diameter of a bike wheel is 45cm. How far will the bike travel if the tires rotate:

   a. Once?

   C = 3.14(45)
   = 141.3 cm

   b. 5 times?

   5C = 5(141.3) = 706.5 cm or 7.07 m

   c. How many rotations will it take to travel 2km? (1 km = 100 000cm)

   2 km = 200 000 cm

   200 000/141.3 = 1 415 rotations

5. A bicycle has one gear that has a diameter of 10cm, and a smaller gear with a diameter of 5cm. How much longer is the circumference of the larger gear than the smaller one?

   Large gear

   C = 3.14(10)
   = 31.4 cm

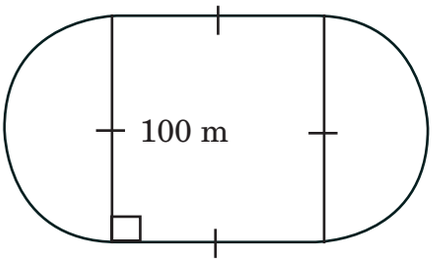
   Small gear

   C = 3.14(5)
   = 15.7 cm

   31.4 – 15.7 = 15.7 cm

   The circumference is twice as long.

6. What is the total distance of this track? Note: The two ends make a circle if put together



C = 3.14(100)
= 314 m ***Circumference of the "circle".***

100 + 314 + 100 = 514 m

Lengths of the sides of the square.

7. Hansel and Gretel were walking around a circular forest. Hansel left Gretel to take a path that cut directly through the middle of the forest. If Hansel walked 3 km, how much farther did Gretel have to walk to meet him on the other side?

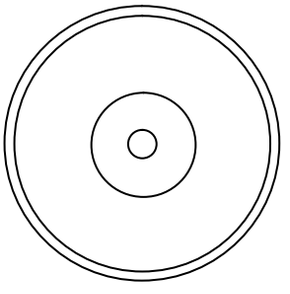
d = 3 km

C = 3.14(3)
= 9.4 km

But Gretel only needs to walk ½ of the circumference: 9.4/2 = 4.7 km
4.7 – 3 = 1.7 km

Gretel will need to walk 1.7 km farther than Hansel.

8. Spencer made a model of the earth for Science. His model started with the inner core with a diameter of 3 cm, the outer core was a layer 4 cm thick, then the mantle which was 8 cm thick, finally the Earth's crust which he made 1 cm thick. What was the final circumference of his model?



diameter = 3 + 4 + 4 + 8 + 8 + 1 + 1 = 29 cm

C = 3.14(29)
= 91.1 cm

His model has a 91.1 cm circumference.

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