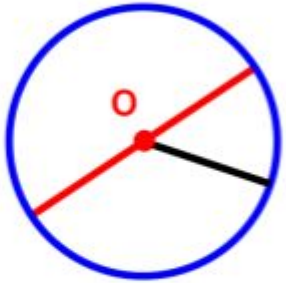
Circumference of a Circle

The **perimeter** of a circle is also called the **circumference**.



The circumference is blue.
The radius is black.
The diameter is red.
O is the center of the circle.

The circumference (C) of a circle is directly proportional to its diameter (d).

The constant of proportionality that relates the diameter to the circumference is the number (π).

For our purposes, $\pi \approx 3.14$.

In reality, π is an irrational number where $\pi = 3.14159265...$

The symbol π is a letter in the Greek alphabet.

The formula to calculate the circumference if you have its diameter is:

$$C = (\pi)\,(d)$$

where C = Circumference $\qquad \pi \approx 3.14$
d = diameter

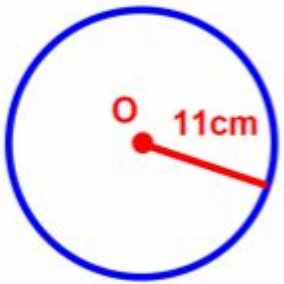
Since, **diameter = (2) (radius)**, or **d = (2) (r)**,if we know the radius of a circle, we can calculate the circumference using the following formula:

$$C = (\pi)\,(2)\,(r) \qquad \text{or} \qquad C = (2)\,(\pi)\,(r)$$

where "r" is the radius

Example 1

Calculate the circumference of the following circle.



For this circle, we know that the radius is 11cm or **r = 11cm**.

What is given to us? The radius - so let's use that formula to calculate circumference ($C = 2\pi r$)

Example 1: Continued

$$C = (2)(\pi)(r)$$

$$C \approx (2)(3.14)(11cm)$$

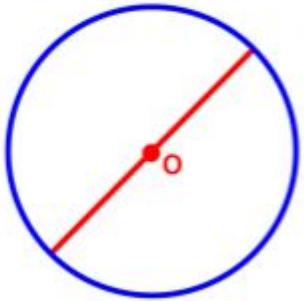
$$C \approx (6.28)(11cm)$$

$$C \approx 69.08cm$$

So, the circumference of the circle is approximately 69.08cm.

Example 2: A little bit of Algebra!

What is the diameter of the circle below if it has a circumference of 47.1cm?



We have the circumference this time, and we are looking for the diameter, so we will use the formula:

$C = \pi d$

We will have to use algebra to solve for the diameter.

Example 2: Continued

$$C = (\pi)(d)$$

$$47.1cm = (3.14)(d)$$

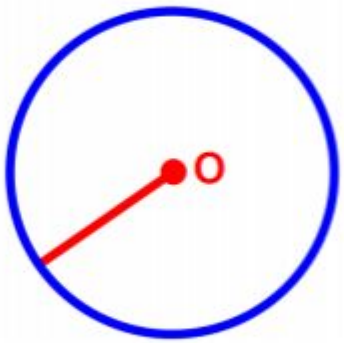
$$\frac{47.1cm}{3.14} = d$$

$$d = 15cm$$

So, the diameter of the circle is 15cm.

Example 3

What is the radius of the circle below if it has a circumference of 50.24cm?



$C = 5.24$ cm

$r = ?$

We are given the circumference, but asked to find the radius, so we will use the formula:

$C = 2\pi r$

We will use algrebra to solve for r.

Example 3 - Continued

$$C = (2)(\pi)(r)$$

$$50.24cm = (2)(3.14)(r)$$

$$50.24cm = (6.28)(r)$$

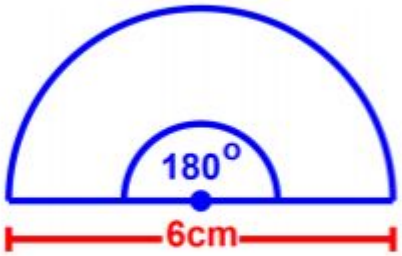
$$\frac{50.24cm}{6.28} = r$$

$$r = 8cm$$

The radius of the circle is 8cm.

Example 4: Semi- Circles

Calculate the perimeter of the following shape.



The curved side is a half circle.

$d = 6$ cm

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ow are we going to find the full perimeter of this shape?

What will we need?

Example 4: Continued

We will need:

1 - The circumference of the semi - circle

2 - The diameter

Perimeter= Circumference + Diameter
Perimeter = Circumference + 6cm

Example 4: Continued

How will we find the circumference of the semi circle? It's not a full circle, only half of one - so we will divide our circumference by 2.

$$C = (\pi)(d)$$

$$C \approx (3.14)(6cm)$$

$$C \approx 18.84cm$$

Circumference of our semi circle: = 18.84 cm /2

= 9.42 cm

Total Perimeter = 9.42 cm + 6cm = 15.42cm

Homework

Math 3000 pages 173 - 174 #1, 2, 3, 4, 15, 17
Assignment on MHS