Circumference & Arc Length

title

Circumference—the distance around a circle

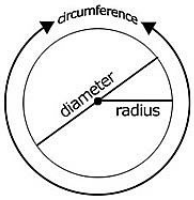
- π (pi)—the ratio of the circumference to the diameter

$\pi = \frac{C}{d}$

Circumference of a Circle

$C = \pi d$ or $C = 2\pi r$

d–diameter and *r*–radius



circumference

Find the indicated measure. $C = \pi d$ or $C = 2\pi r$

Find the circumference of a circle with a radius of 17 cm.

$C = 2\pi(17)$ $C = 34\pi \approx 106.81 cm$

Find the circumference of a circle with a diameter of 14 in.

$C = \pi(14); = 14\pi \approx 43.98$ in

Find the radius of a circle with a circumference of 26π yd.

$C = 2\pi r$

$\frac{26\pi}{2\pi} = \frac{2\pi r}{2\pi}$ $r = 13$ yd

Find the diameter of a circle with a circumference of 12 ft.

$C = \pi d$

$\frac{12}{\pi} = \frac{\pi d}{\pi}$

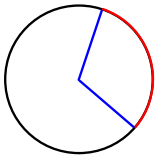
$3.82 ft = d$

examples

Arc length—a portion of the circumference of a circle

Arc Length Corollary

$$\frac{\text{Arc Length}}{2\pi r} = \frac{m\overset{\frown}{\text{Arc}}}{360°}$$

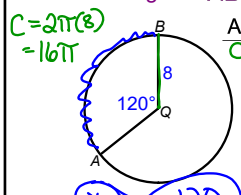


Note: The length of a ***semicircle*** is one half the circumference, and the length of a ***90° arc*** is one quarter the circumference.

arc length

Find the length of $\overset{\frown}{AB}$

$C=2\pi(8)$
$=16\pi$



$\frac{\text{Arc Length}}{C=2\pi r} = \frac{m\overset{\frown}{\text{Arc}}}{360°}$

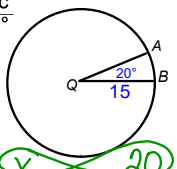
$\frac{x}{16\pi} = \frac{120}{360}$

$360x = 16\pi \cdot 120$

$\frac{360x}{360} = \frac{1920\pi}{360}$

$x = 16.76$

$C=2\pi(15)$



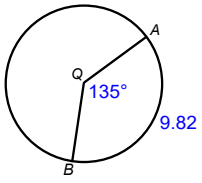
$\frac{x}{30\pi} = \frac{20}{360}$

$\frac{360x}{360} = \frac{600\pi}{360}$

$x \approx 5.24$

examples

Find the indicated measure.



$\frac{\text{Arc Length}}{C=2\pi r} = \frac{m\overset{\frown}{\text{Arc}}}{360°}$

Circumference

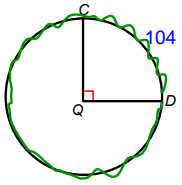
$\frac{9.82}{x} = \frac{135}{360}$

$\frac{135x}{135} = \frac{3535.2}{135}$

$x = 26.19$

example

Find the indicated measure.



Radius

$\times\ \frac{104}{4}$

$C = 416 = \frac{2\pi r}{2\pi}$

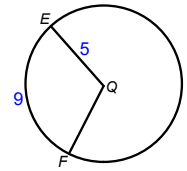
$66.21 = r$

$\frac{\text{Arc Length}}{2\pi r} = \frac{m\overset{\frown}{\text{Arc}}}{360°}$

example

Find the indicated measure.

$C = 2\pi r$
$= 10\pi$



$\frac{\text{Arc Length}}{2\pi r} = \frac{m\overset{\frown}{\text{Arc}}}{360°}$

$m\overset{\frown}{EF}$

$\frac{9}{10\pi} = \frac{x}{360}$

$\frac{10\pi x}{10\pi} = \frac{3240}{(10\pi)}$

$x = 103.13°$

example

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