Geometry Info Sheet #45
Perimeter and Area of Circles and Sectors; Pi

Definitions

Circle: The set of all points in a plane equidistant from a given point (the **center**)

Radius: A line segment from the center of a circle to any point on the circle

Diameter: A line segment containing the center of a circle whose endpoints are on the circle; the length of the diameter of a circle is equal to twice the length of the radius of the circle

Circumference: The distance around a circle; in other words, the perimeter of a circle

Arc: A curved section of a circle; an arc is an unbroken part of a circle

Sector: A region of a circle bounded by two radii and an arc

π: Pronounced "pie", and sometimes written as **pi**, it is the ratio of a circle's circumference C to its diameter d ($\frac{C}{d}$); π is the 16th letter of the Greek alphabet and represents a ratio that is constant for <u>all</u> circles; pi is an irrational (and, therefore, non-repeating) number; it is not possible to get an exact value for pi, as the number goes on forever and never ends

Radian: A unit of angular measure equal to the measure of a central angle formed by an arc (on a circle) whose length is equal in length to the radius of the circle; by using a radius with a length of one unit, since the circumference of a circle is $2\pi r$, a circle (360º) is equal to 2π radians, which means that one radian is equal to almost 57.3 degrees

To convert <u>degrees to radians</u>, multiply the degrees by $\frac{\pi}{180}$. For <u>radians to degrees</u>, multiply the radians by $\frac{180}{\pi}$.

First 1000 Digits of Pi

3.14159265358979323846264338327950288419716939937510582097494459230781640628620899862803482534211706798214808651328230664709384460955058223172535940812848111745028410270193852110555964462294895493038196442881097566593344612847564823378678316527120190914564856692346034861045432664821339360726024914127372458700660631558817488152092096282925409171536436789259036001133053054882046652138414695194151160943305727036575959195309218611738193261179310511854807446237996274956735188575272489122793818301194912983367336244065664308602139494639522473719070217986094370277053921717629317675238467481846766940513200056812714526356082778577134275778960917363717872146844090122495343014654958537105079227968925892354201995611212902196086403441815981362977477130996051870721134999999837297804995105973173281609631859502445945534690830264252230825334468503526193118817101000313783875288658753320838142061717766914730359825349042875546873115956286388235378759375195778185778053217122680661300192787661119590921642019893

Formulas

The **circumference** C of a **circle** with diameter d and radius r is given by: $C = \pi d$ **or** $C = 2\pi r$

The **area** A of a **circle** with radius r is given by: $A = \pi r^2$

In a circle with radius r, the **length** L of an **arc** with degree measure M is: $L = \frac{M}{360°}(2\pi r)$ **or** $\frac{L}{2\pi r} = \frac{M}{360°}$

In a circle with radius r, the **area** A of a **sector** with degree measure M is: $A = \frac{M}{360°}(\pi r^2)$ **or** $\frac{A}{\pi r^2} = \frac{M}{360°}$