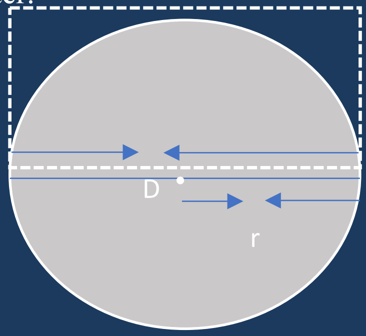
The Circle

This is how I remember the circle equations: Remember that the smallest unite in geometry is the point [Like the cent for the US currency]

The diameter is the straight line the pass through the center from one point to another in the circle circumference and the radius is half of it; from one point in the circumference to the center.



1) To calculate the circumference, I know that the circle has a circumference of 365º or 2π or the angle of the circle is 365º or 2π. Convert that 365º or 2π to a distance unit meter, foot, centimeter, inch,…etc. How can I convert the degree of angle to distance. Look at half of the circle, it has the diameter and the arch of the π or 180 º. I know that the arch is longer than the diameter. The arch is π or 180 º. Think about the rectangle; the arch distance is shorter than three sides of the rectangle, one side is the diameter, the other two sides are the equal to the radius. For example, if the diameter is 4cm the radius is 2 cm. The arch distance is less than 4cm + 2 cm + 2 cm = 8 cm. The arch distance is the degree in Radian $\pi \times r = 3.14 * 2 = 6.28$ cm
   Multiply the arch distance by 2 to get the distance of the circle circumference because the bottom arch is the same distance as the top arch. 6.28*2 = 12.56 cm.
   Note: we know that each circle has 365º or 2π angle; why the circumference equation has the radius, because we think about the circumference as how long is the distance that you will take a circa lure walk from the center, this is the thing that make you walk different from the plants that orbit in different distance from the sun and take longer time according to their speed which will make the year length is different from plant to another.

2) The area of the circle: The area of the top half of the circle is less than the area of two squares [each square has the radius as length of its edges 2^2 cm= 4 cm]. The area of the circle is less than the area of 4 squares: 4 cm * 4 = 16 cm. The area of the circle equals to the area of the 4 square minus the area of the four shapes between the circle circumference and the squares' edges. Thus, $r^2 * \pi$ is the equation of the circle $2^2 * \pi$ = 12.56 cm. Why $r^2 * \pi$? The area of the top half of the circle is two squares r * 2r (the diameter) or $r^2 + r^2 = 2r^2$, the bottom half is the same $2r^2$. This equal to $4r^2$ is true if the

side is not an arch with an angle and when converted to distance unit we multiply by π. That is why the approximation $4r^2$ in real is πr^2 or $3.14 r^2$.

3) The area of a sector in the circle. The sector is a portion of the circle; so the angle of the sector / the angles of the circle = sector / 2 π. We calculate the area the circle then multiply it by the proportion of the sector and the circle. For example a sector of π of half the circle [the proportion is π/2 π = ½] multiply this by the circle area $2^2 * \pi$ = 12.56 cm * ½ = 6.28 cm.
4) MN or My Number or Mohammad Number is [the infinity number of digits -1]; in numerical calculations the smallest unit of precision.
   The circle equation: We think about two adjacent points; what is the slop of the line that is pass these adjacent points[we know that the number of points in the circle is infinity ∞ and what you see in the drawn circles by computers and they look perfect is just and approximation of the circle because when you zoom or maximized the draw to a bigger scale the circles will look distortion because they use pixels to be displayed on the screens and dots to be printed on paper]; so point x in the circle next to point y in the circle. Assuming that point x located at 1 on the x coordination axis [x-axis] and located at 1 on the y coordination axis [y-axis]. There are two adjacent point to two other adjacent has the same [x-axis] and the same negative [x-axis], Similarly to the [y-axis]. Assuming that the center at (0,0) the adjacent point to (1,0) is (0.9 MN 9, MN or 0.MN1).
   The slop is y2-y1/x2-x1 = (negative) MN / (negative) MN = 1
   The line equation between two adjacent is y=x + c where c is a constant.
   How far these point from the center of the circle is
   Sqrt[$(p_{1x} - c_x)^2 + (p_{1y} - c_y)^2$] = Sqrt[$(p_{2x} - c_x)^2 + (p_{2y} - c_y)^2$]
   Sqrt[$(1 - 0)^2 + (0 - 0)^2$] = Sqrt[$(c_x - 0.9MN)^2 + (c_y - 0.MN1)^2$] = sqrt[1]
   This gives us the equation

$$x^2 + y^2 = r^2$$

$Where\ x\ is\ the\ point\ located\ at\ x\ and\ y\ is\ the\ point\ located\ at\ y\ and\ r\ is\ the\ radius$

To draw this circle using computer [we should use the quarter sign for positive and negative].

Center of the circle is $\begin{bmatrix}0\\0\end{bmatrix}$

MN here is 0.000001 the smallest precision that the last digit after the decimal point is 1 and all the preceded digits are zeros 0.

1st point is $\begin{bmatrix}1\\0\end{bmatrix}$ the next point in the same quarter is $\begin{bmatrix}1\\0\end{bmatrix} - \begin{bmatrix}MN\\-MN\end{bmatrix} - \begin{bmatrix}MN\\-MN\end{bmatrix} - \begin{bmatrix}MN\\-MN\end{bmatrix} \ldots. \begin{bmatrix}0\\1\end{bmatrix}$

For the second quarter $\begin{bmatrix}0\\1\end{bmatrix} - \begin{bmatrix}MN\\MN\end{bmatrix} - \begin{bmatrix}MN\\MN\end{bmatrix} - \begin{bmatrix}MN\\MN\end{bmatrix} \ldots. \begin{bmatrix}-1\\0\end{bmatrix}$

For the third quarter $\begin{bmatrix}-1\\0\end{bmatrix} - \begin{bmatrix}-MN\\MN\end{bmatrix} - \begin{bmatrix}-MN\\MN\end{bmatrix} - \begin{bmatrix}-MN\\MN\end{bmatrix} \ldots \begin{bmatrix}0\\-1\end{bmatrix}$

For the fourth quarter $\begin{bmatrix}0\\-1\end{bmatrix} - \begin{bmatrix}-MN\\-MN\end{bmatrix} - \begin{bmatrix}-MN\\-MN\end{bmatrix} - \begin{bmatrix}-MN\\-MN\end{bmatrix} \ldots. \begin{bmatrix}1\\0\end{bmatrix}$

As you know graphic in computer uses matrixes for calculation because they can be calculated very fast using GPU[Graphics Processing Unit] and here we have a vector 1x2.

Link : https://malkahtani.com/circle.pdf

Mohammad Alkahtani

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