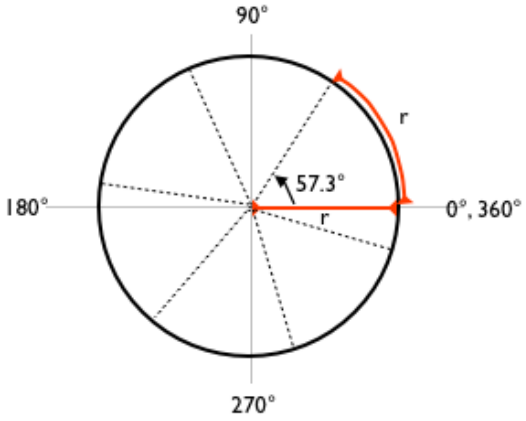
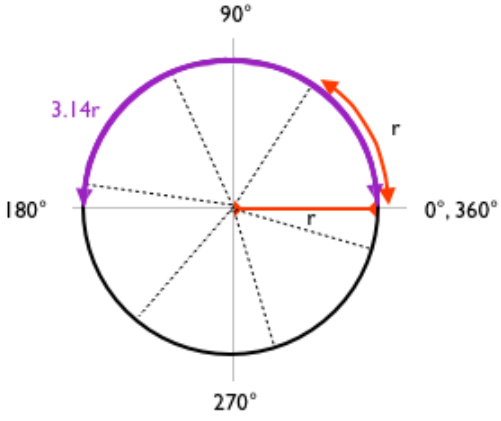
Circle: circumference and area

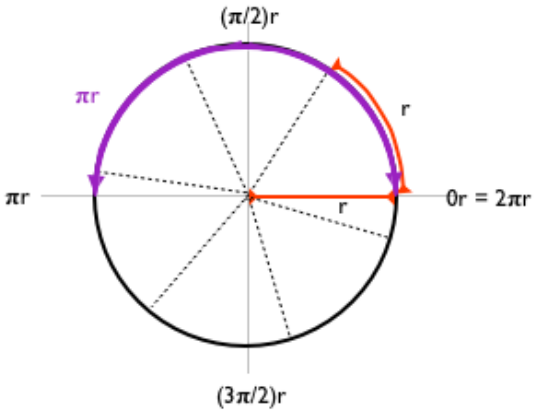
The perimeter of a circle is called its 'circumference'. We measure it using arcs of length r, where r is the radius of the circle. Each arc of length r spans an angle of about 57.3°.



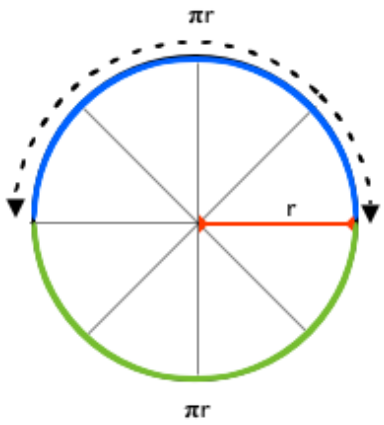
An arc that spans 90° measures about 1.57r, one that spans 180° is about 3.14r long, and one that spans 360° is about 6.28r long.



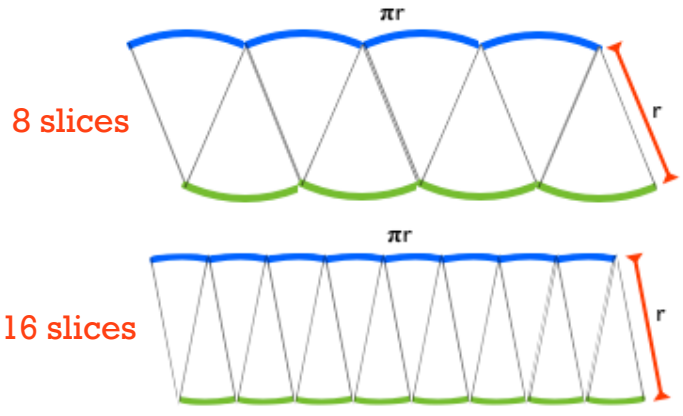
We define π (pronounced 'pie') such that the arc that covers 180° is πr long, i.e., π is about 3.14. Thus, the circumference has a length of 2πr.



Let's color the top and bottom halves of the circumference in different colors. Each half has a length of πr. Divide the circle in slices:



Now we arrange the slices to form a rough parallelogram. The more slices we use, the closer the shape is to a rectangle.



When the slices are infinitely thin, we get a rectangle of width πr and height r, with an area of $A = \pi r^2$; thus, the area of the circle from where we took the slices must also be $A = \pi r^2$.