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SCIENCE IN ANCIENT ARTWORK

Selected Math Constants in Geometry: Unit Circles, Squares and Triangles

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www.earthmatrix.com

ISBN 58616-217-9

Math Constants in Geometry

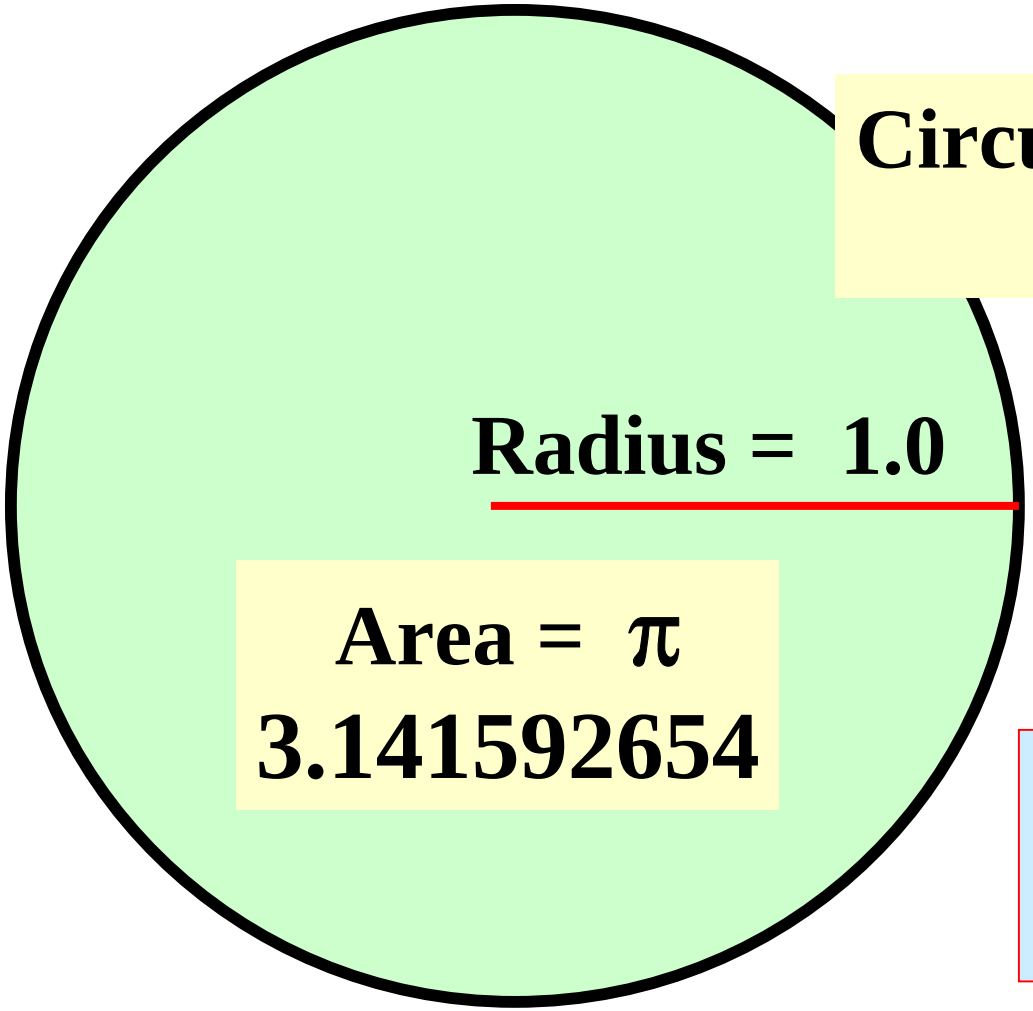
Presentation

In this brief essay, we shall examine some of the math constants that are associated with specific procedures in geometry. Often times, books on geometry offer the different geometrical formulae in algebraic terms without any explicit mention to the numbers and math involved in the equations. Such a procedure is especially visible regarding math constants in geometry associated with the dimensions and areas of certain geometrical figures, such as squares, circles and triangles.

We shall examine selected examples, where it may be significant to review the numbers and math implicit in the geometry, as these appear to relate directly to ancient reckoning.

Math Constants in Geometry: Unit Circle

Classical Unit Circle in Geometry Books



"A circle whose radius is R = 1 unit is called a *unit circle*."

Math Constants in Geometry: The Unit Circles

In our mind,
a circle may have its *diameter*,
***area*, or *circumference* as 1.0**
in order to be considered
to represent a *unit circle*.

Diameter 1.0

.7853981634 = Area

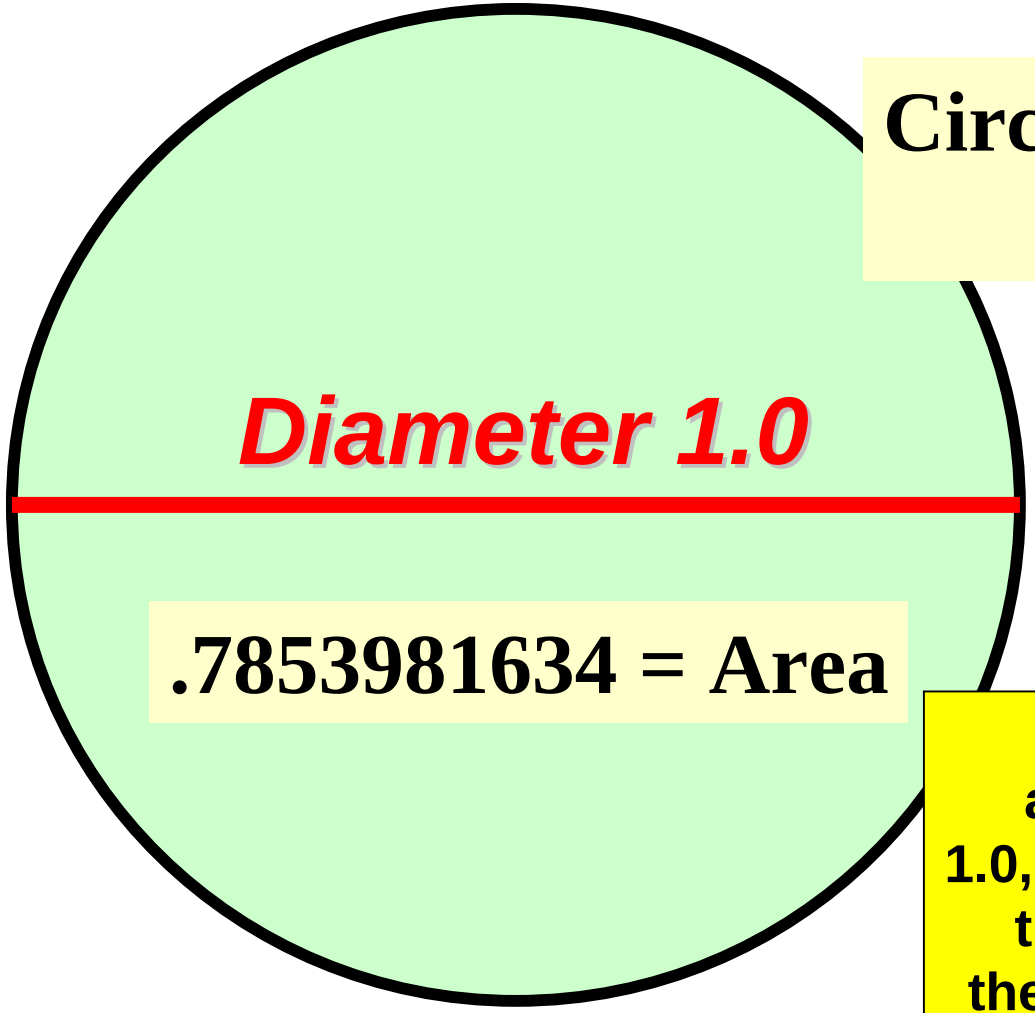
1.0 = Circumference

.3183098862 Diameter

Diameter 1.128379167

1.0 = Area

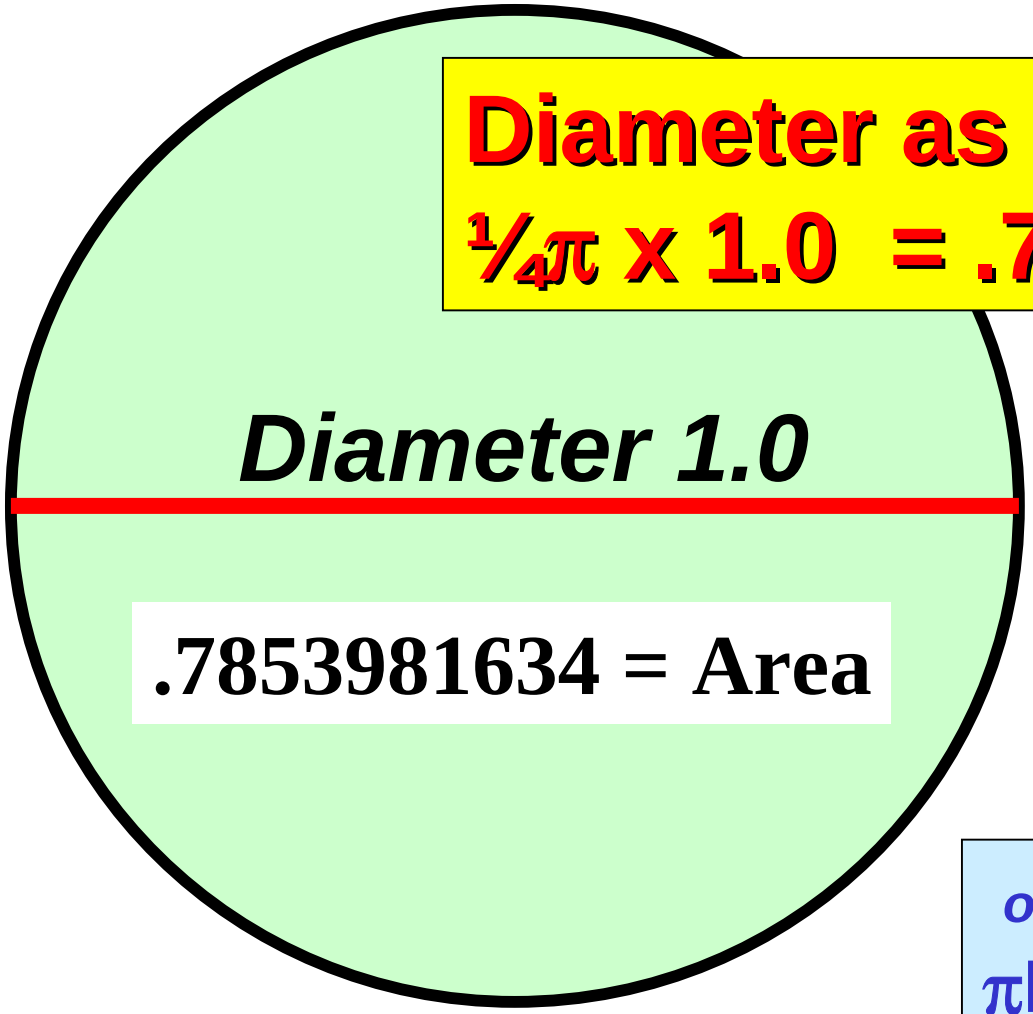
Math Constants in Geometry



Circumference π
3.141592654

By viewing the unit circle as of its diameter measure of 1.0, we may now better visualize the numbers in geometry and their relationship to the ancient reckoning counts.

Math Constants in Geometry: A Circle with Diameter 1.0



Diameter as Unit Circle 1.0

¼π x 1.0 = .7853981634 area

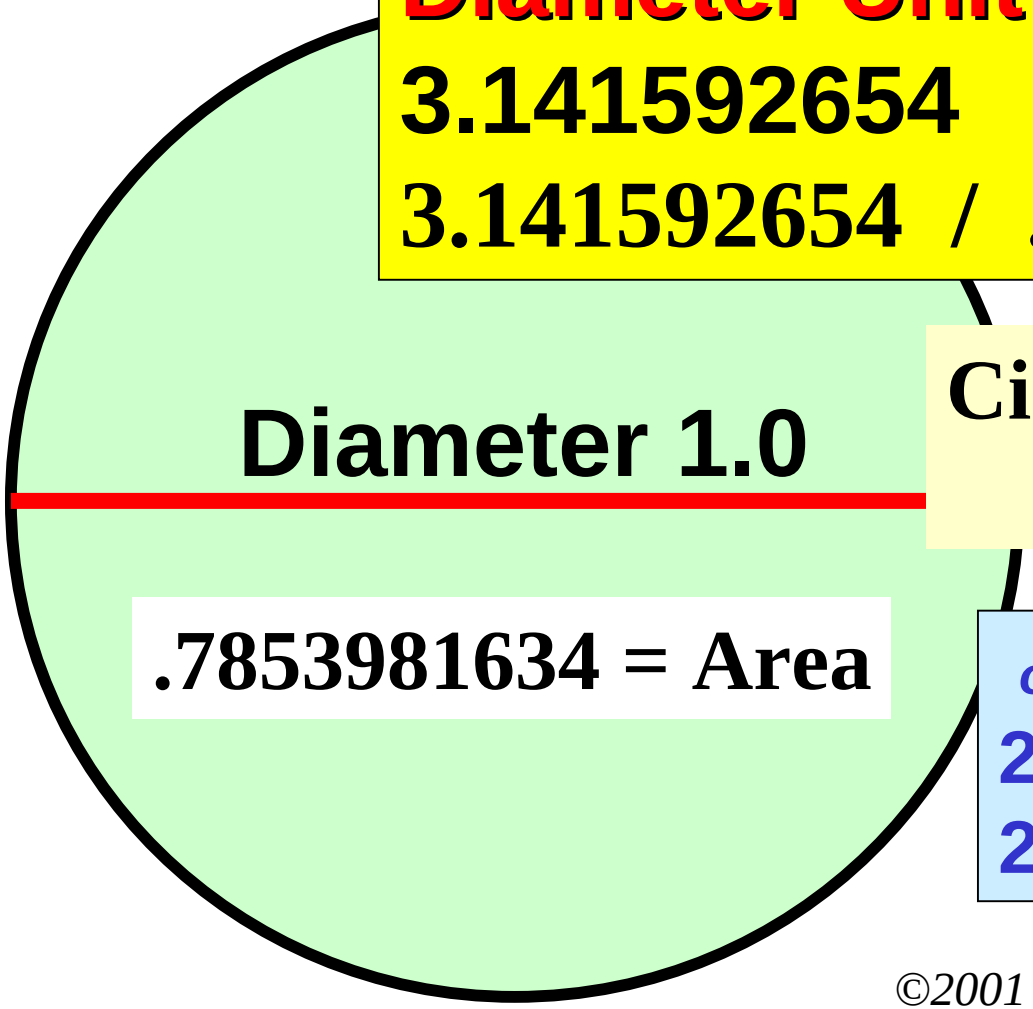
or,

πR^2 = area of a circle

π x $.5^2$ = .7853981634

Math Constants in Geometry:
Circumference of a Circle with Diameter 1.0

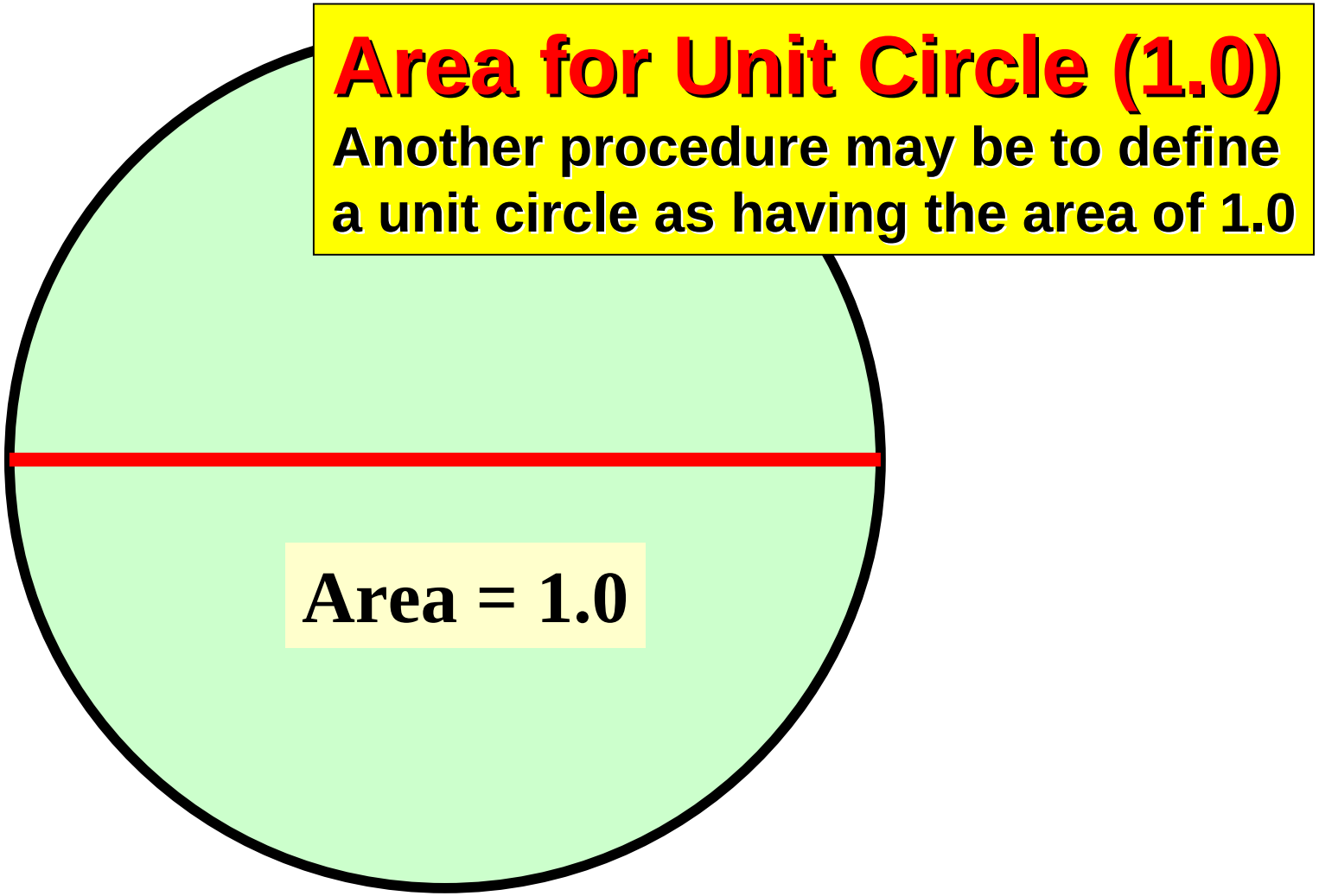
Circumference for
Diameter Unit Circle
3.141592654 = π (Pi)
3.141592654 / .7853981634 = 4.0



Circumference π
3.141592654

or,
2πR = circumference
2π x .5 = 3.141592654

Math Constants in Geometry:
Area as Defining a Unit Circle 1.0



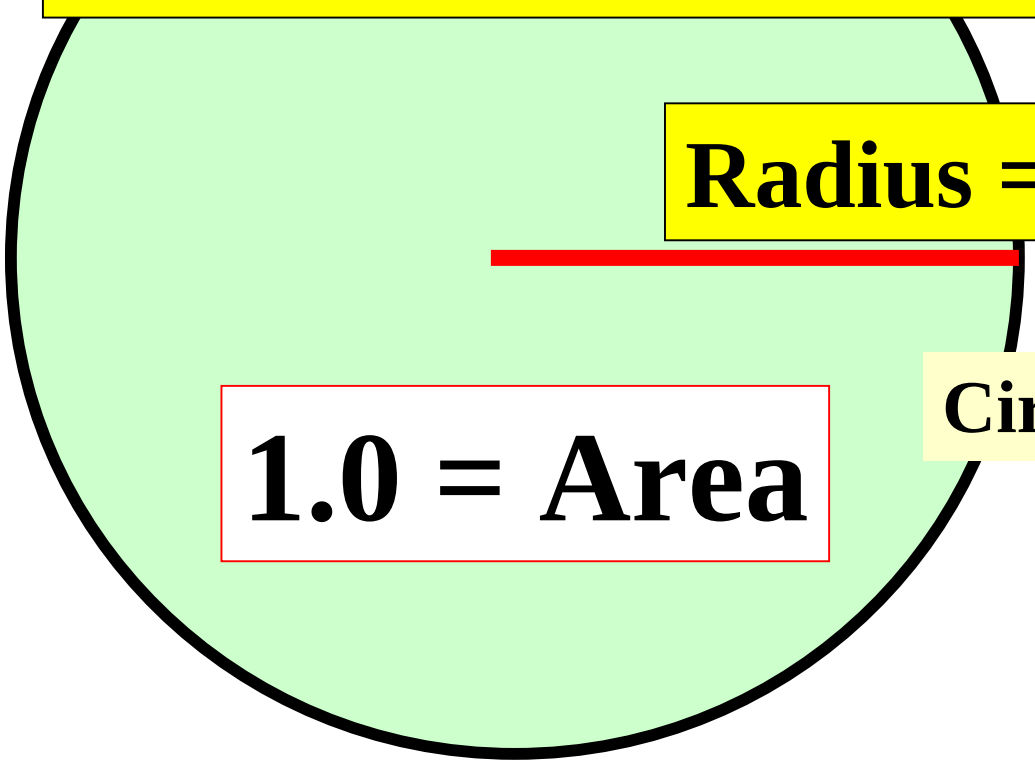
Math Constants in Geometry: A Circle with Area 1.0

π x .5641895836² = 1.0 area

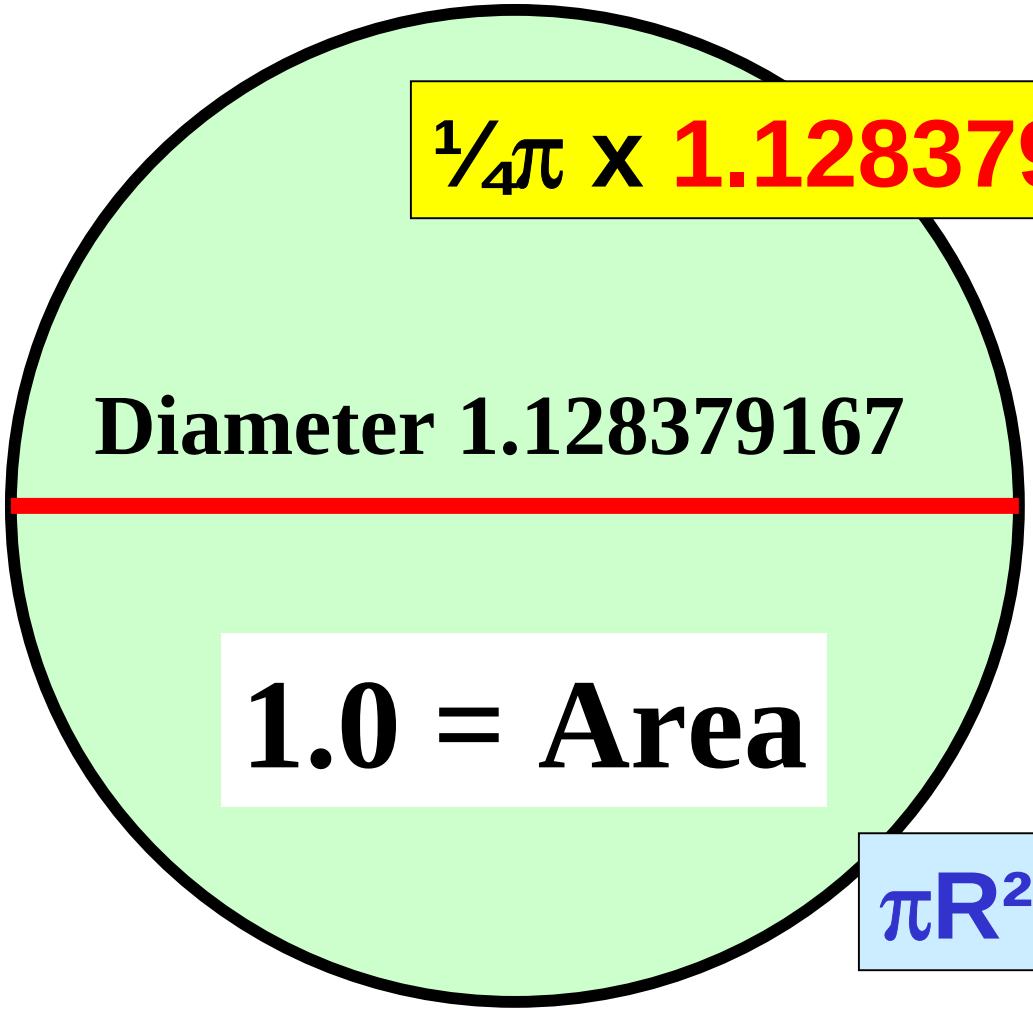
or traditionally

1.0 / π = .3183098862

$\sqrt{}$.3183098862 = .5641895836



Math Constants in Geometry: A Circle with Area 1.0

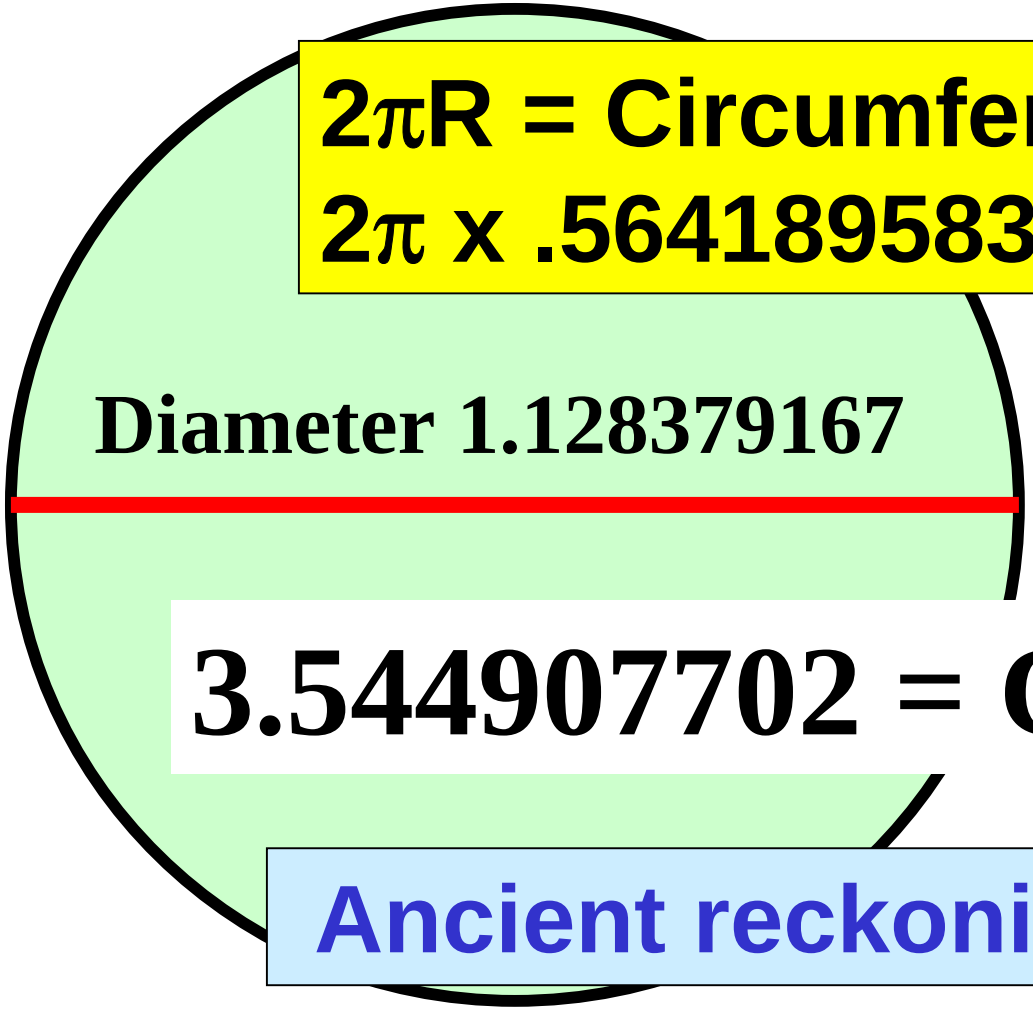


$\frac{1}{4}\pi \times 1.128379168^2 = 1.0$ area

πR^2 = ***Area of circle***

Math Constants in Geometry

A Unit Circle Constant for Circumference: 3.544907702



2πR = Circumference

2π x .5641895836 = 3.544907702

Diameter 1.128379167

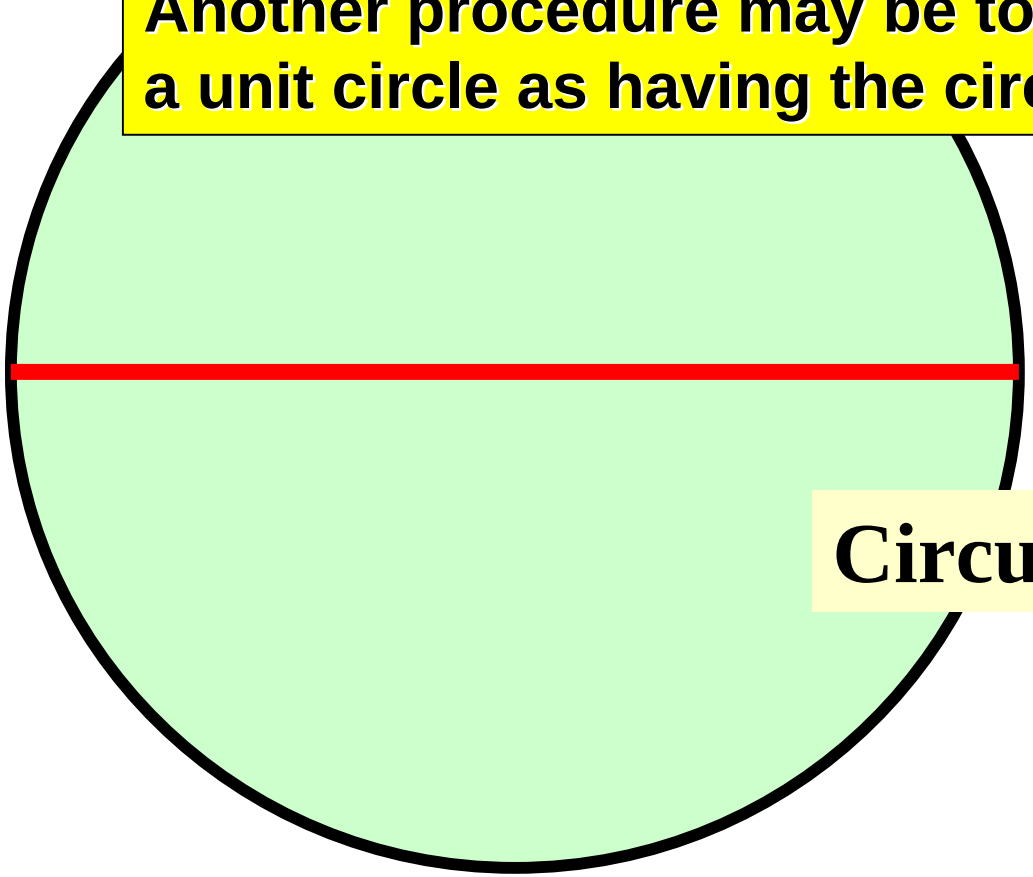
3.544907702 = Circumference

Ancient reckoning count: *354c*

Math Constants in Geometry:
Circumference as Defining a Unit Circle 1.0

Circumference for Unit Circle (1.0)

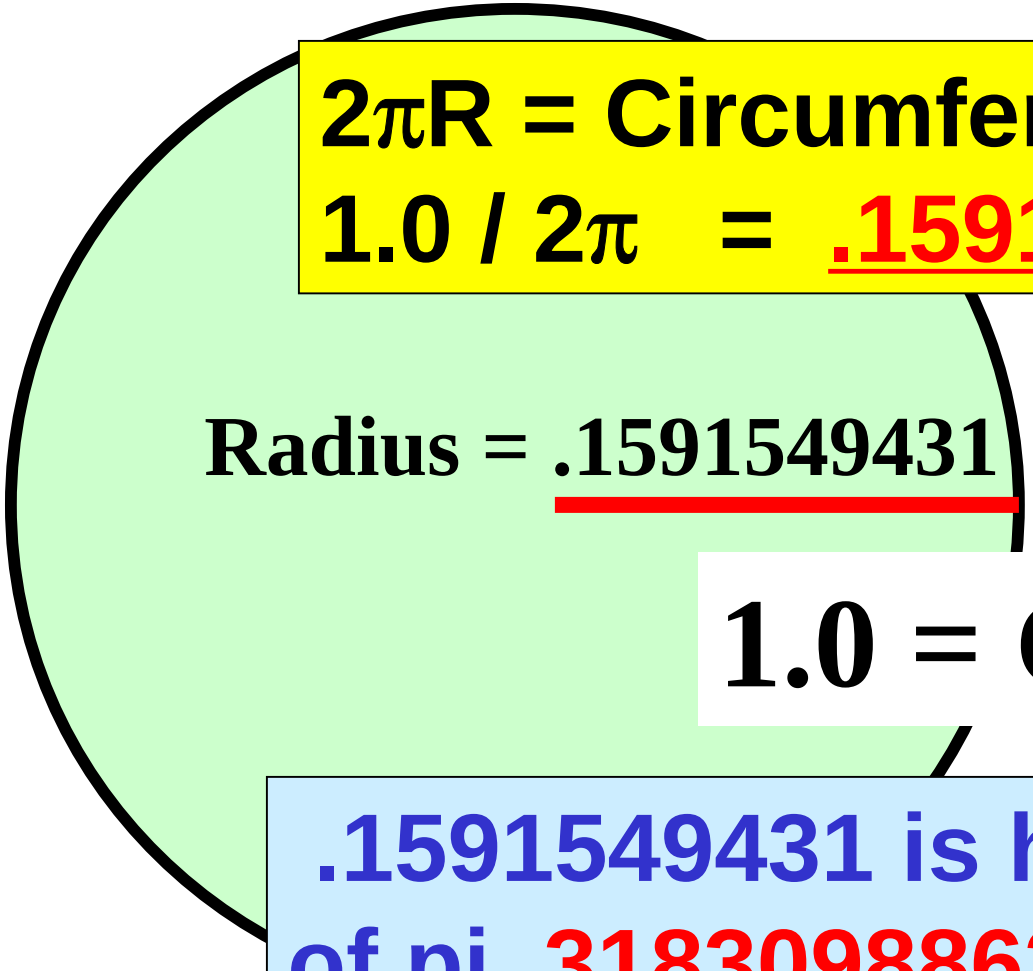
Another procedure may be to define
a unit circle as having the circumference of 1.0



Circumference = 1.0

Math Constants in Geometry:
A Circle with Circumference as 1.0

A Unit Circle Constant for Circumference: 1.0



$2\pi R$ = Circumference

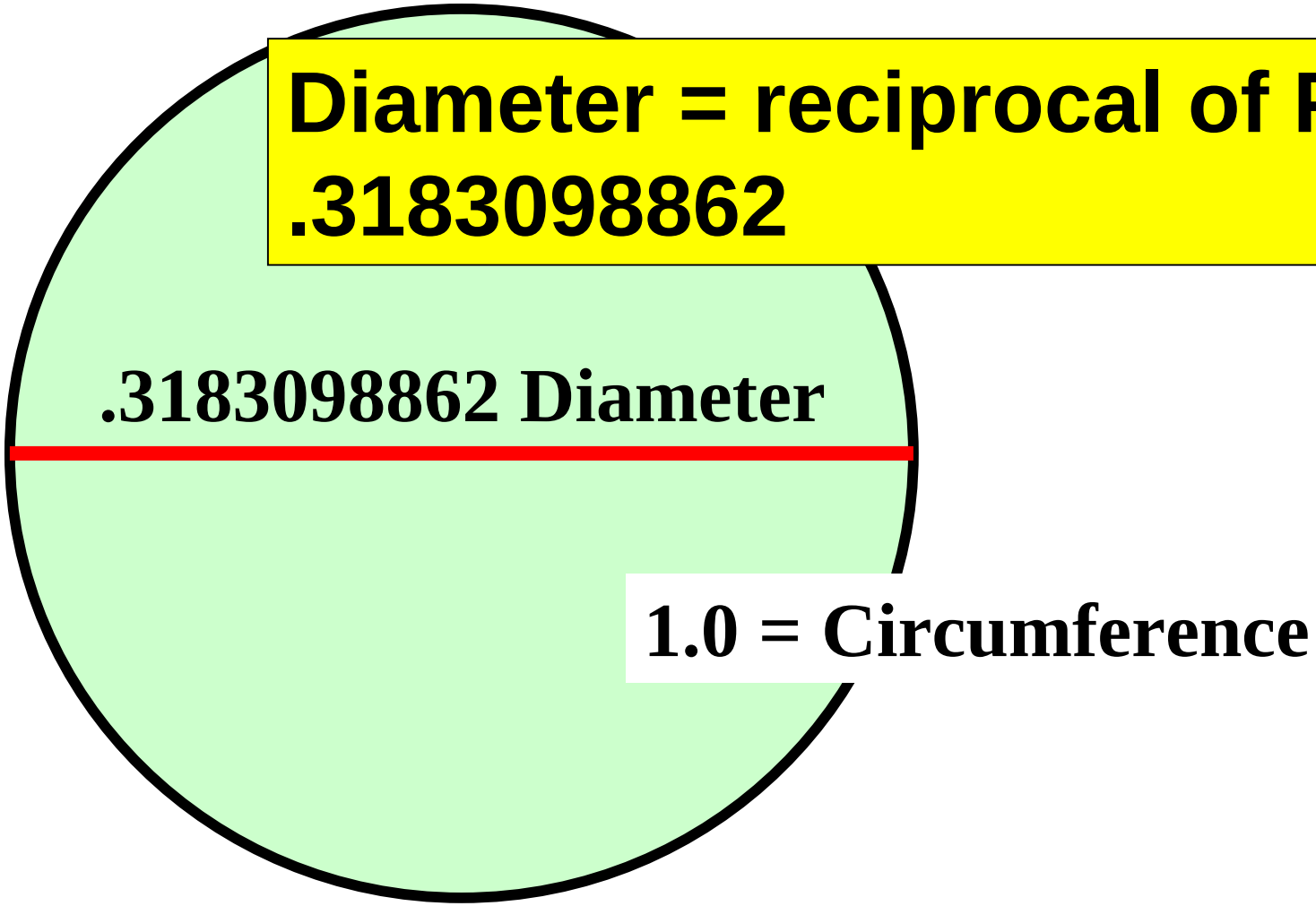
1.0 / 2π = .1591549431 radius

Radius = .1591549431

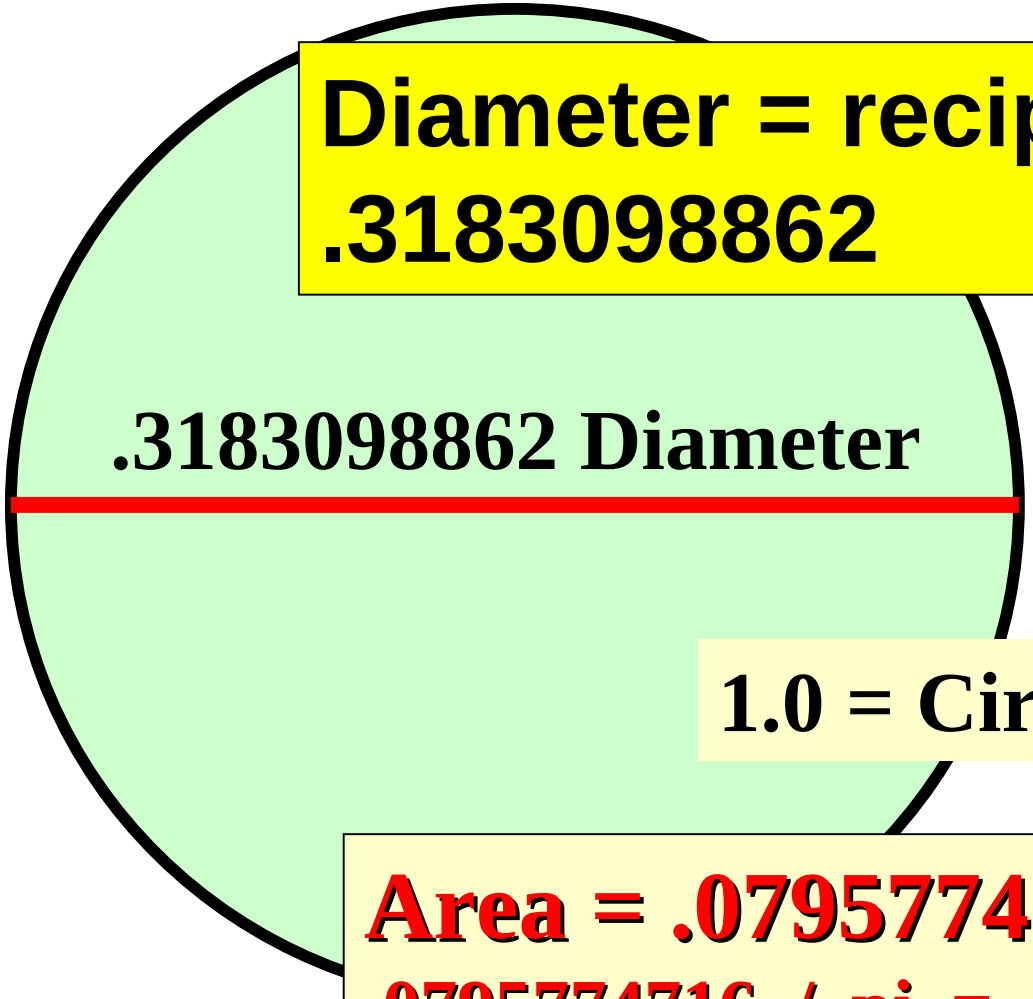
1.0 = Circumference

.1591549431 is half the reciprocal of pi .3183098862 (= diameter)

Math Constants in Geometry:
A Circle with Circumference as 1.0



Math Constants in Geometry:
A Circle with Circumference as 1.0



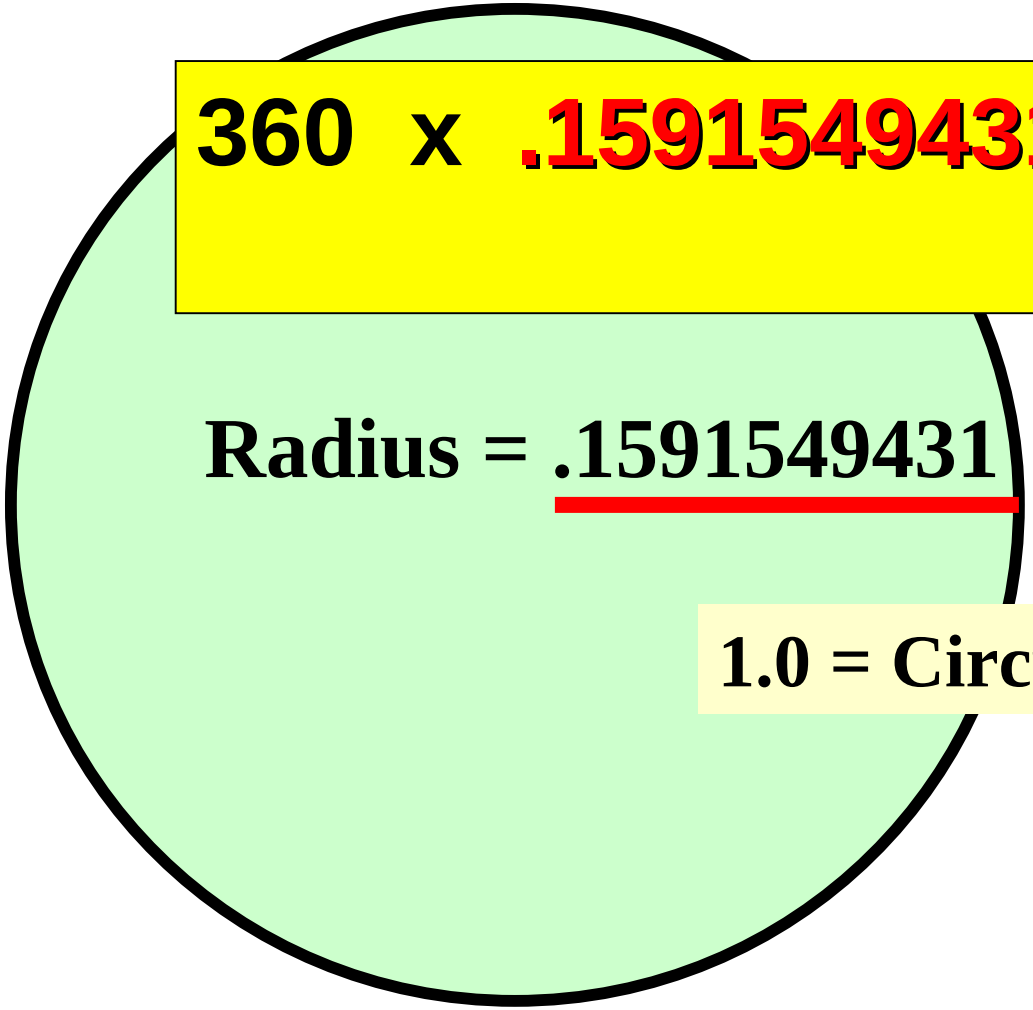
Diameter = reciprocal of Pi
.318309886

.318309886 Diameter

1.0 = Circumference

Area = .0795774716
.0795774716 / pi = 4.0

Math Constants in Geometry:
A Circle with Circumference as 1.0



360 x .1591549431 = 57.29577952

One Radian

Radius = .1591549431

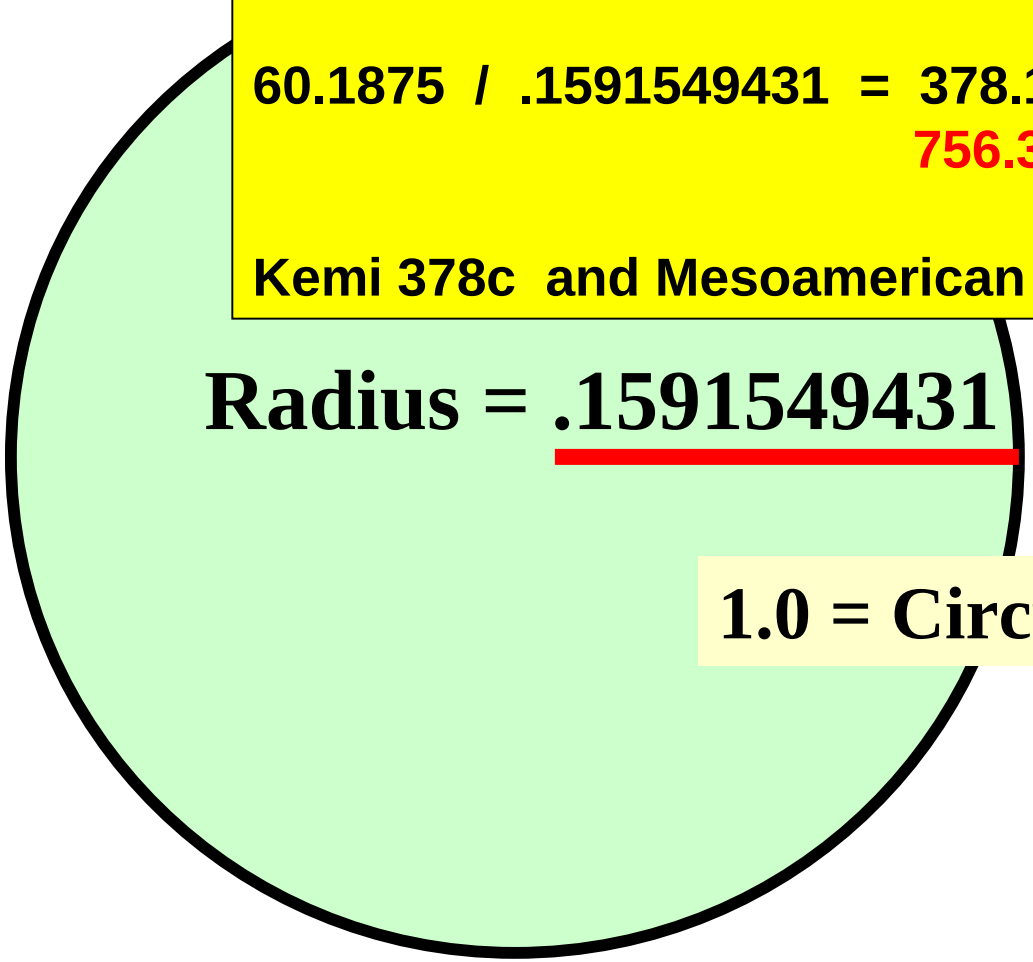
1.0 = Circumference

Math Constants in Geometry:
A Circle with Circumference as 1.0

If the height of the Great Pyramid is 481.5 feet as projected by many scholars, then, 481.5, 240.75, 120.375, 60.1875

60.1875 / .1591549431 = 378.169157
756.3384313

Kemi 378c and Mesoamerican 338 (676c) counts



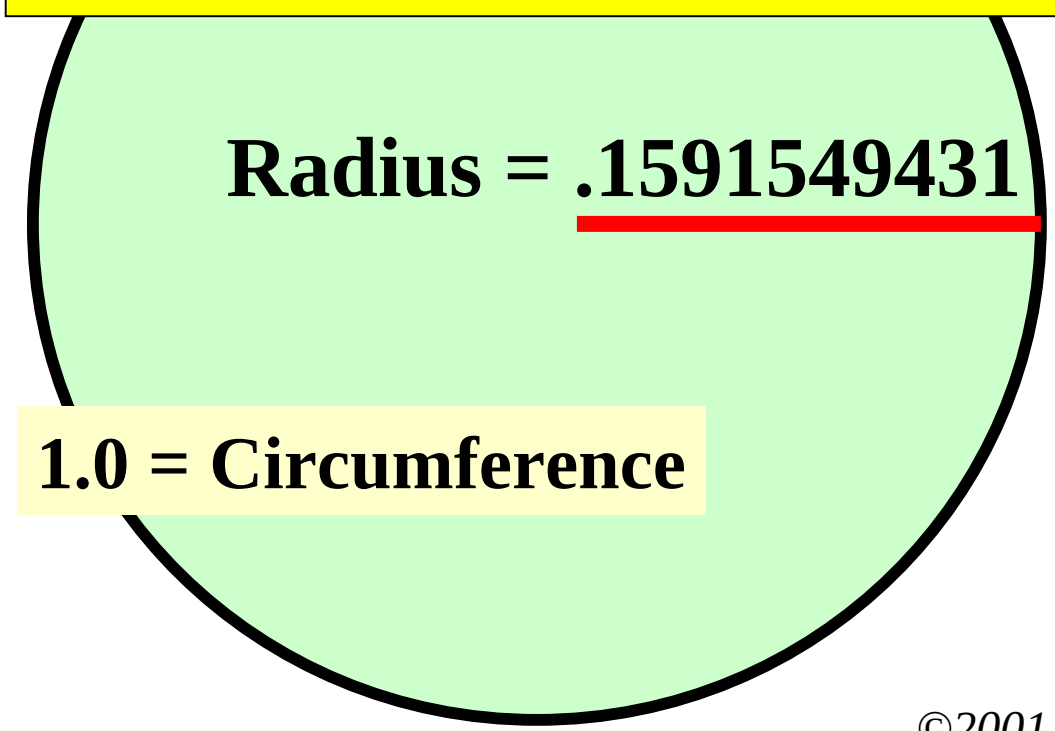
Radius = .1591549431

1.0 = Circumference

Math Constants in Geometry:
A Circle with Circumference as 1.0

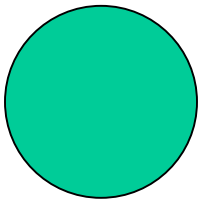
If the side measurement of the Great Pyramid is 755.7909764 feet as we have computed elsewhere, then:

755.7909764
1511.581953
3023.163906 x .1591549431 = 481.1514794 feet height

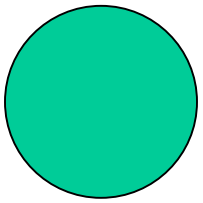


An ancient Mesoamerica count is 151840. Note the relation of the mantissa:
151840 - 151479.4 = 360.6

Math Constants in Geometry: Unit Circles

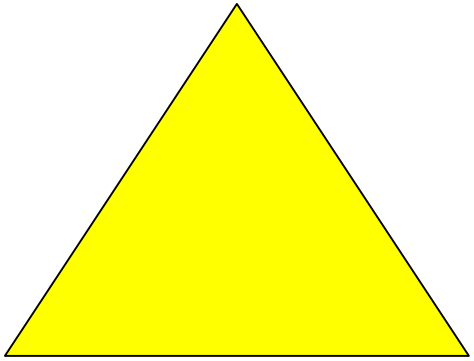


Diameter	Area	Circumference
1.0	.7853981634	3.141592654
1.128379167	**1.0**	3.544907702
.3183098862	.0795774716	**1.0**



Diameter	Area	Circumference
1.0	**.7853981634**	**3.141592654**
1.128379167	1.0	**3.544907702**
.3183098862	**.0795774716**	1.0

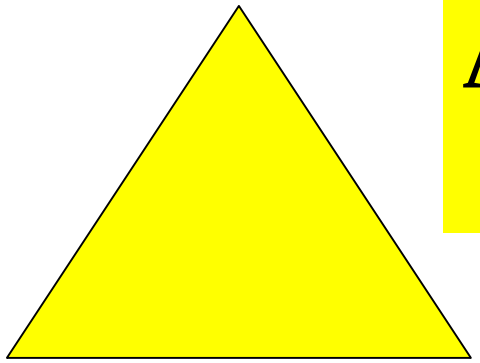
Math Constants in Geometry



Math Constants in Geometry

Equilateral Triangle Side is Unit Triangle 1.0

Constant for Area: .4330127019



$$\text{Area} = a^2/4(\sqrt{3})$$

$$1^2/4\,(\sqrt{3})$$

.4330127019 = Area

$(\sqrt{3}) = 1.732050808$

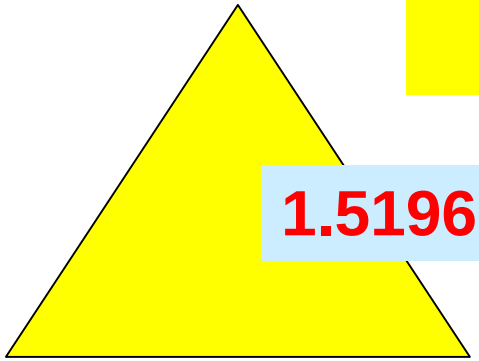
$(\sqrt{3}) / 4 =$ **.4330127019 Constant**

Math Constants in Geometry: Unit Triangle Area 1.0

Equilateral Unit Triangle with Area is 1.0

Area = $a^2/4(\sqrt{3})$

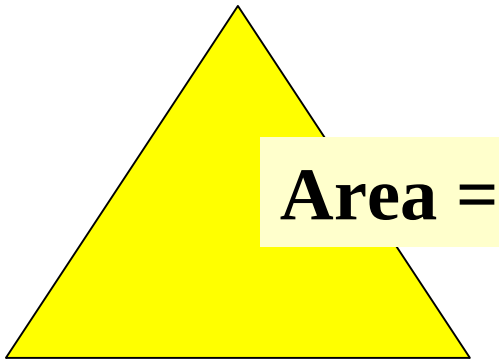
$1.519671371^2 /4 (\sqrt{3}) = 1.0$



Area = 1.0

1.519671371 Constant Side Measure

Math Constants in Geometry:
Unit Triangle Area 1.0 :: Unit Circle Area 1.0



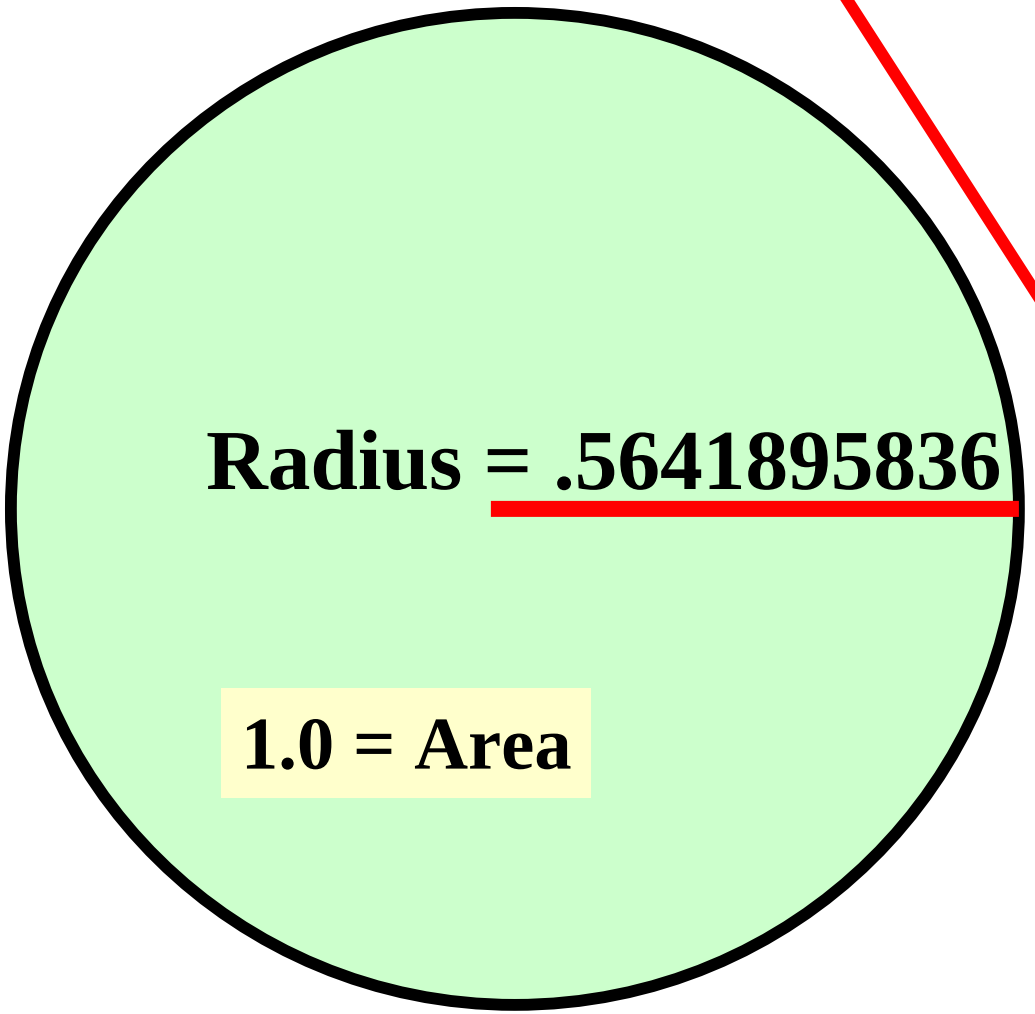
Area = 1.0

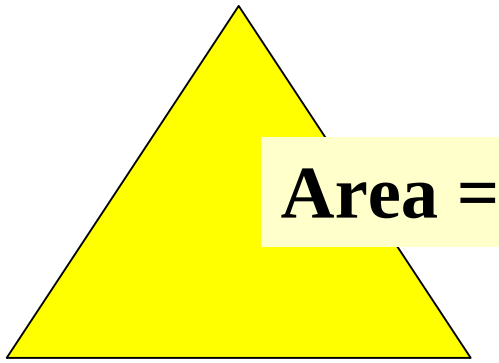
Side 1.519671371

Radius = .1591549431

1.0 = Circumference

Math Constants in Geometry:
A Circle with Area 1.0 and A Triangle with Unit Area 1.0



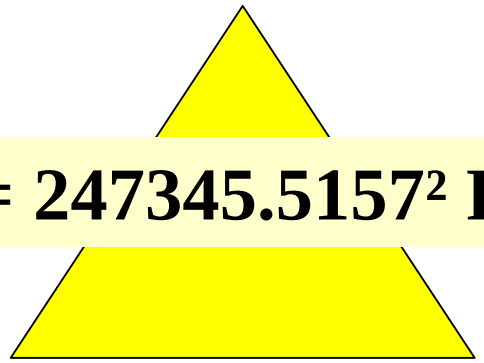


Side 1.519671371

Math Constants in Geometry: 2.309401076
Computing the Area of An Equilateral Triangle

The classical formula in geometry:

Area = $a^2/4(\sqrt{3})$



Area = 247345.5157² Feet

Side 755.7909764 Feet

a^2 / 2.309401076 = Area

Side 755.79098764² = 571220

571220 / 2.309401076 constant = 247345.5157 Sq.Ft.

Math Constants in Geometry

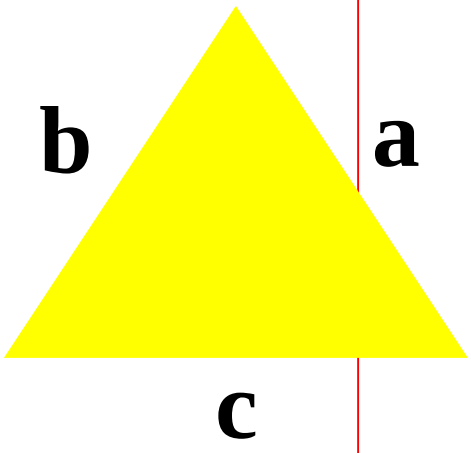
Base Area of a Triangle Unit One (1.0)
Alternate Method where a = 1, b = 1, c = 1

$\sqrt{s(s-a)(s-b)(s-c)}$

$s = \frac{1}{2}(1+1+1) = 1.5$

$\sqrt{1.5x.5x.5x.5} = \sqrt{.1875}$

.4330127019

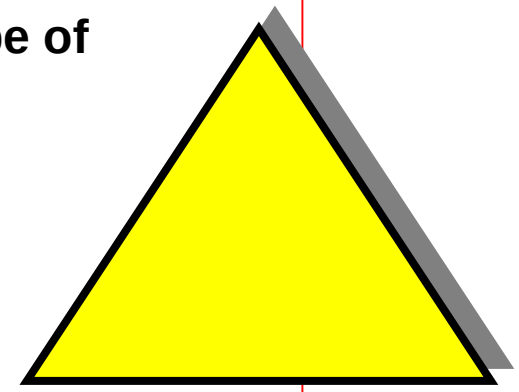


.4330127019 = Area

[Note: Geometry books generally offer only .433]

Math Constants in Geometry

$\sqrt{.1875} = .4330127019$



One may wonder whether the ancients adjusted the shape of the Great Pyramid to correspond to an area related to the .1872 (Maya Long-Count Period fractal or, to the Consecration number (.432).

If one employs the Maya Long Count Period fractal:

$\sqrt{.1872} = .4326661531$

(Note the 666c count mediating the Consecration number (432c) and the number that is often assigned to Jesus Christ (153c).

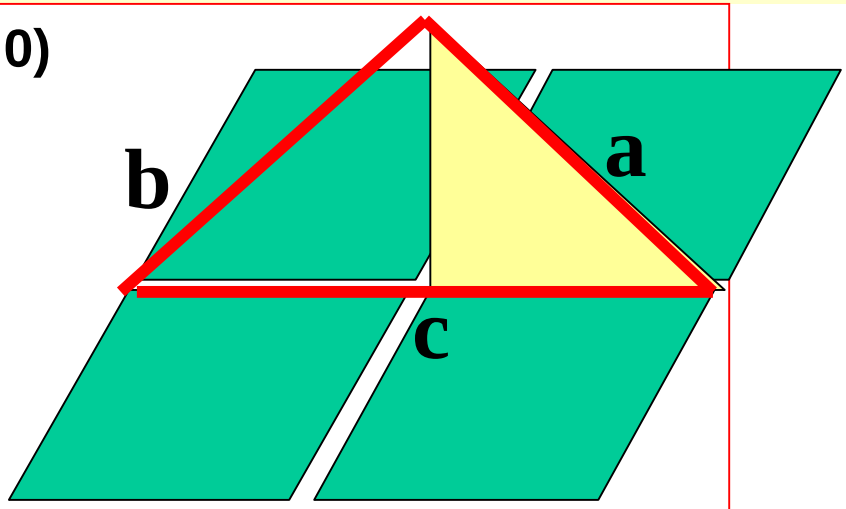
If one employs the adjusted Consecration Number, 432c:

$\sqrt{.432} = .186624$

(Note that .186624 - .187200 = .000576c a Maya Long Count fractal), whereby remainder math may be employed for the differences and equivalencies.

Math Constants in Geometry

Base Area of a Triangle Unit One (1.0)
Alternate Method where
a = 612.8580586
b = 612.8580586
c = 755.7909764



$$\sqrt{s(s-a)(s-b)(s-c)}$$

$$s = \tfrac{1}{2}(612.8580586 + 612.8580586 + 755.7909764) = 990.7535468$$

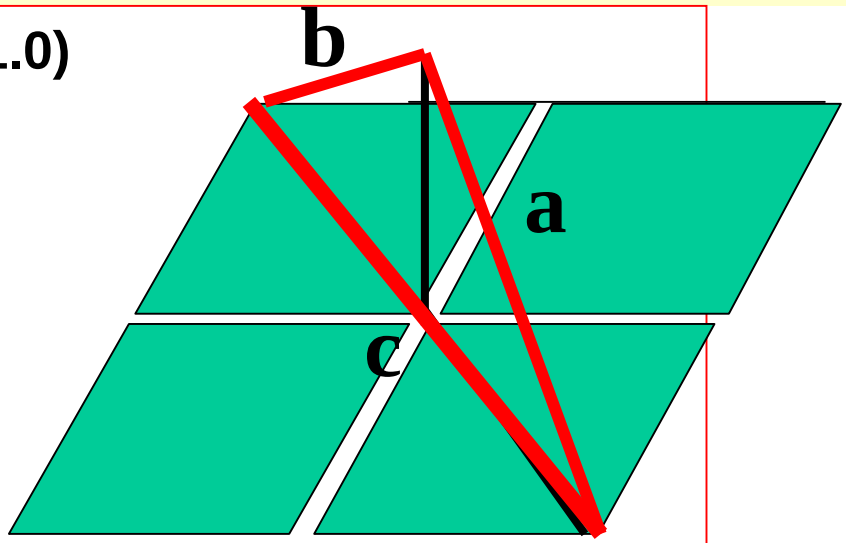
$$\sqrt{990.7535468 \times 377.8954882 \times 377.8954882 \times 234.9625704} =$$

$$\sqrt{3.324357595}$$

182328.2094 Area of cross section of the Great Pyramid

Math Constants in Geometry

Base Area of a Triangle Unit One (1.0)
Alternate Method where
a = 720
b = 720
c = 1068.849849



$$\sqrt{s(s-a)(s-b)(s-c)}$$

$$s = \tfrac{1}{2}(720 + 720 + 1068.849849) = 1254.424925$$

$$\sqrt{1254.424925 \times 534.424925 \times 534.424925 \times 185.575076} =$$

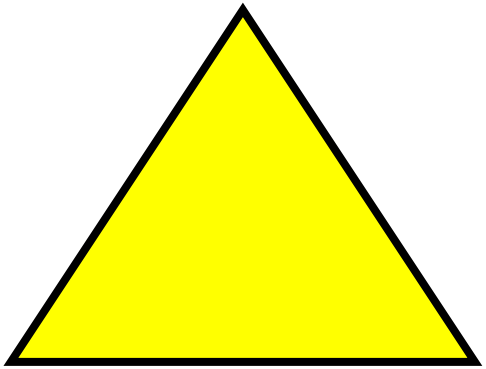
$$\sqrt{6.648715223}$$

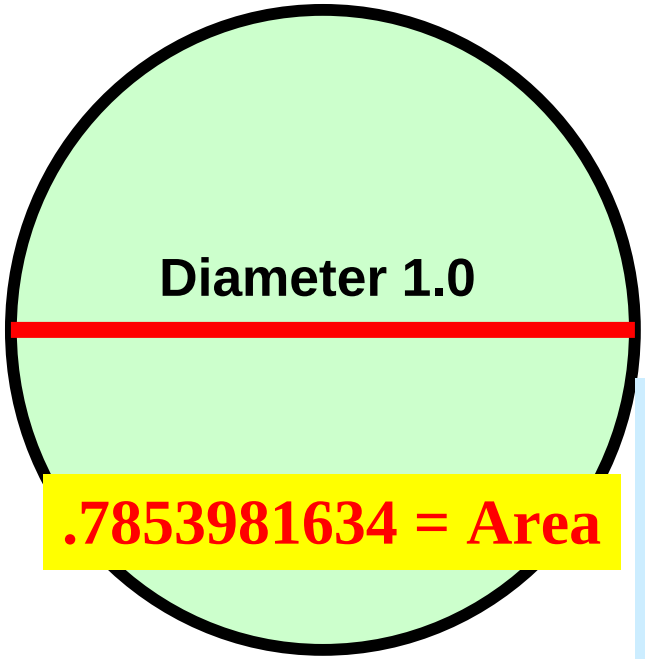
257851.0272 Area of diagonal cross section of the Great Pyramid

Math Constants in Geometry

Equilateral Triangle Side is Unit 1.0

Constant for Area is *one-fourth* of $(\sqrt{3})$ = .4330127019



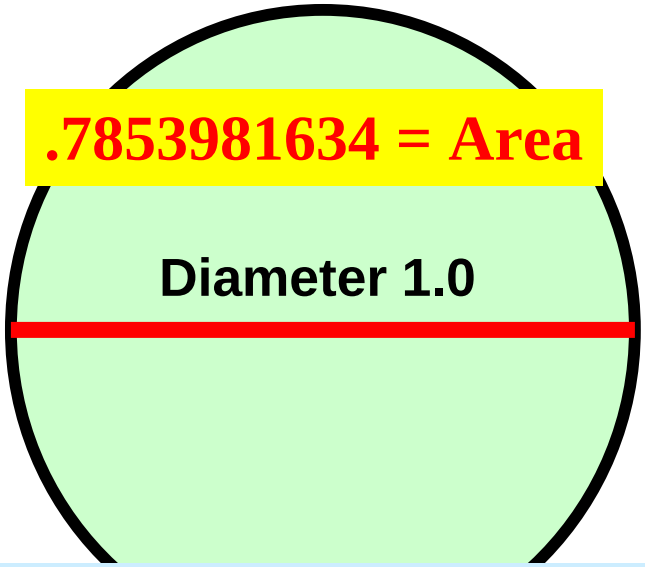


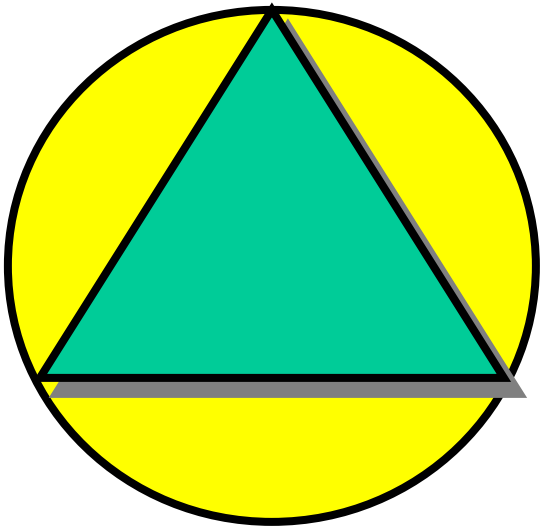
3.141592654 / .7853981634 = 4.0
Constant for area of unit circle 1.0
is *one-fourth* of pi (π)

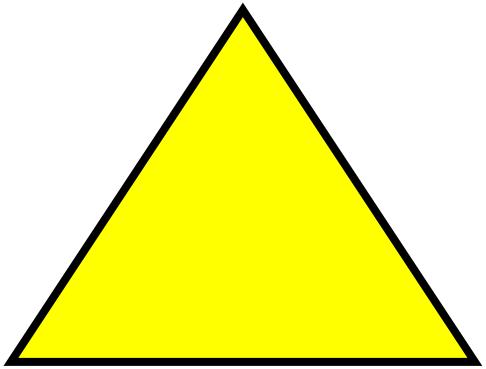
Math Constants in Geometry

Equilateral Triangle Side is Unit 1.0

Constant for Area is one-fourth of $(\sqrt{3})$ = .4330127019







Reciprocal of pi .3183098862 / .4330127019 = .7351051939

Reciprocal of .7351051939 = 1.360349523

Math Constants in Geometry

.7853981634 x .4330127019 = .3400873808

.6801747616

1.360349523

.3400873808

.1700436904

.0850218452

.0425109226

.0212554613

.0106277307

.0053138653

.0026569327

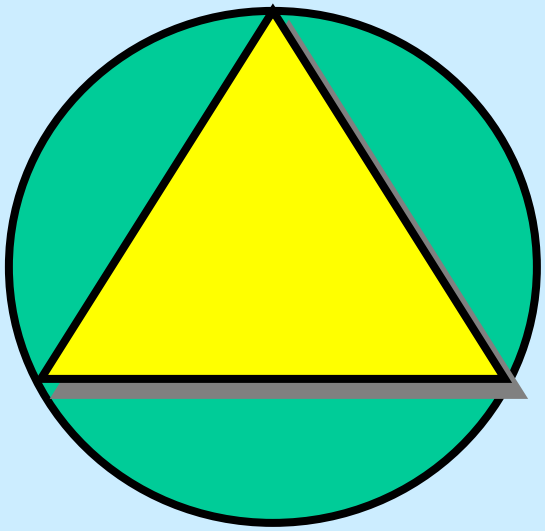
.0013284663

.0006642331656

.0003321165828

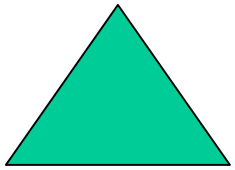
.000166058291**4** :: Fractal Atomic Mass Unit

(1.66054 x 10^{-27} kg)

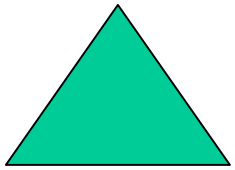


The ***Atomic Mass Unit*** represents a direct numerical relationship with the unit area of a circle and an equilateral triangle.

Math Constants in Geometry
Unit Triangles

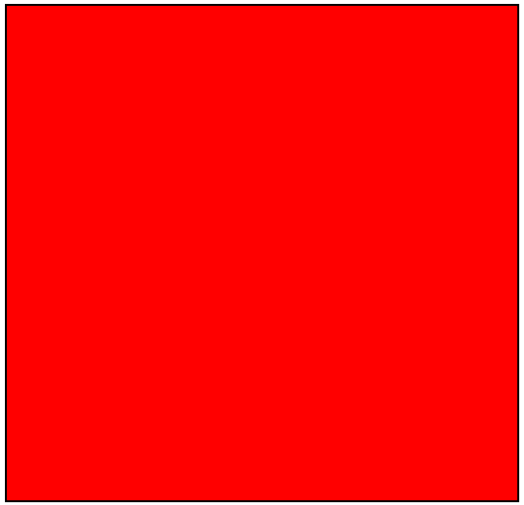


Side	Area	Perimeter
1.0	.4330127019	3.0
1.519671371	**1.0**	4.559014113
.33333333	.1443375672	**1.0**



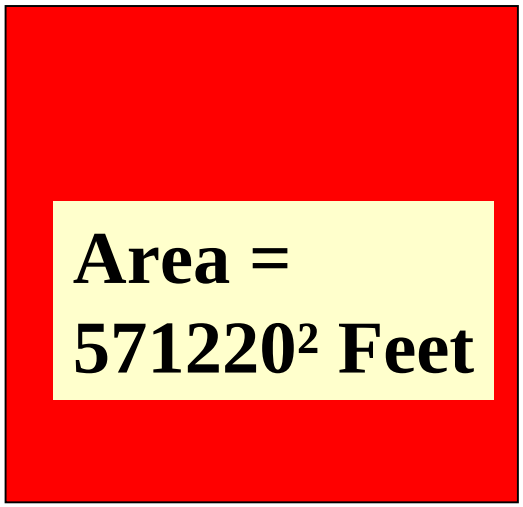
Side	Area	Perimeter
1.0	**.4330127019**	**3.0**
1.519671371	1.0	**4.559014113**
.33333333	**.1443375672**	1.0

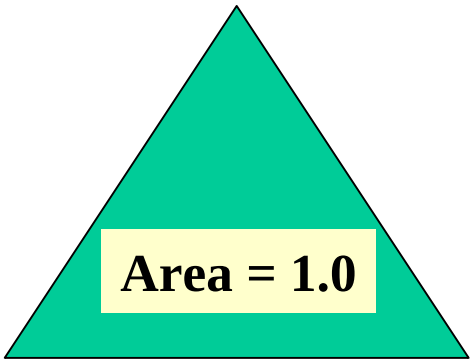
Math Constants in Geometry:



Math Constants in Geometry:
A Square with Area 1.0 and A Unit Triangle with Area 1.0

Side 755.7909764





Unit Triangle
Side 1.519671371

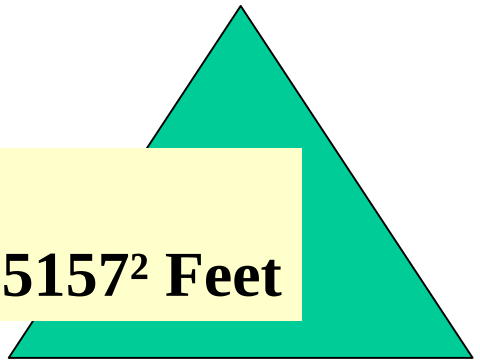
1.519671371^2 = 2.309401076

571220 / 2.309401076 = 247345.5157² Feet
Area of Equilateral Triangle
with Side of 755.7909764 feet

Math Constants in Geometry: 2.309401076
A Square and An Equilateral Triangle with Same Side Measure

755.7909764

Area = 571220² Feet



Area = 247345.5157² Feet

Side 755.7909764 Feet

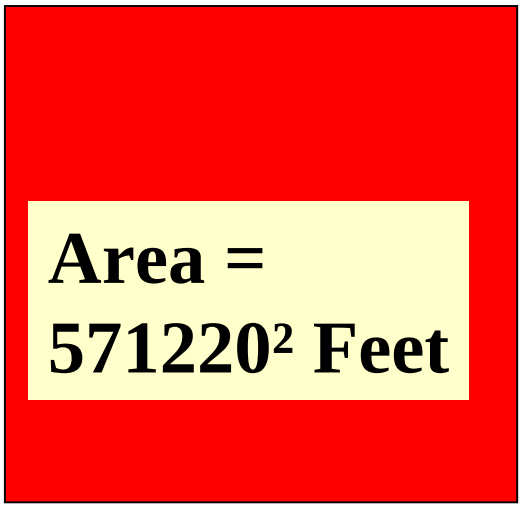
1.519671371² = 2.309401076

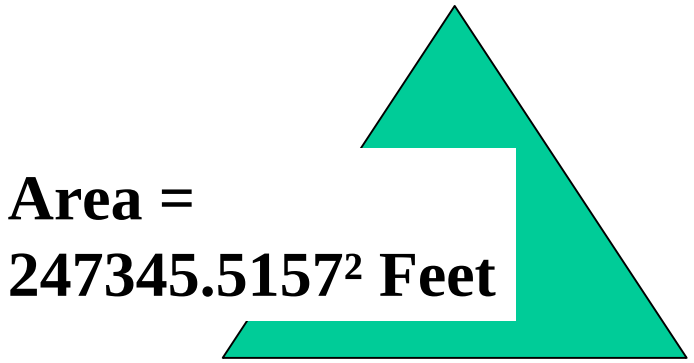
571220 / 2.309401076 constant = 247345.5157

Note: 23094 from 2304 Maya series.

Math Constants in Geometry: 2.309401076
A Square and An Equilateral Triangle with Same Side Measure

755.7909764





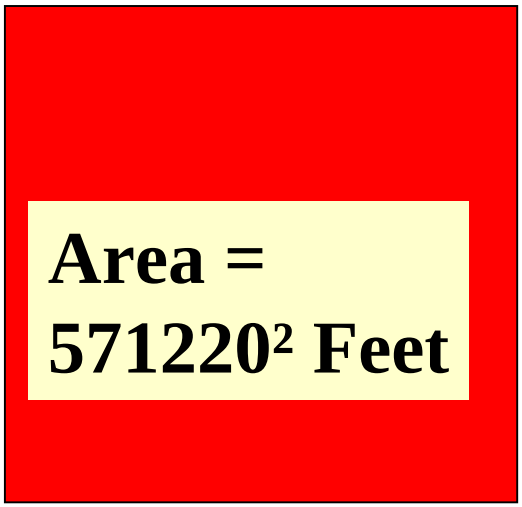
Side 755.7909764 Feet

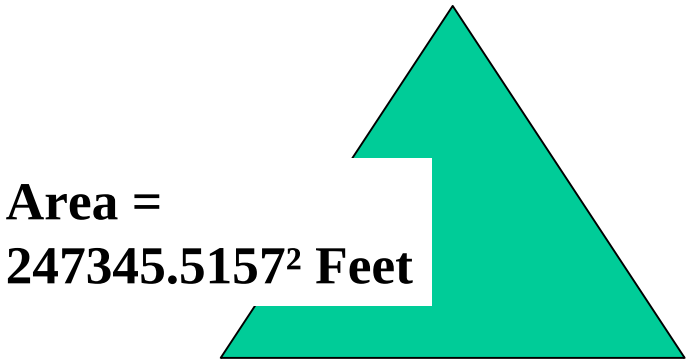
Area of any square divided by 2.309401076 yields area of a similar equilateral triangle with same side measurement.

571220 / 2.309401076 constant = 247345.5157

Math Constants in Geometry: 2.309401076
A Square and An Equilateral Triangle with Same Side Measure

755.7909764





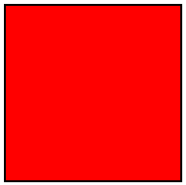
Side 755.7909764 Feet

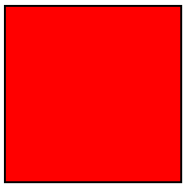
Area of any square divided by 2.309401076 (4/√3) yields area of a similar equilateral triangle with same side measurement.

Moreover

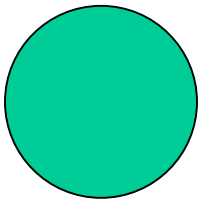
2.309401076 x 1.360349523 = 3.141592652 Pi (π)

Math Constants in Geometry:
Unit Squares

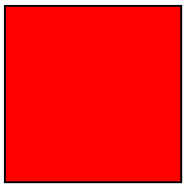
	Side	Area	Perimeter
	**1.0**	1.0	4.0
	1.0	**1.0**	4.0
	.25	.0625	**1.0**

	Side	Area	Perimeter
	1.0	**1.0**	**4.0**
	1.0	1.0	**4.0**
	.25	**.0625**	1.0

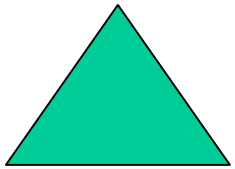
Unit Circles, Unit Squares, and Unit Triangles
The Table of Math Constants in Geometry



Diameter	Area	Circumference
1.0	.7853981634	3.141592654
1.128379167	**1.0**	3.544907702
.3183098862	.0795774716	**1.0**

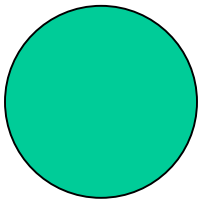


Side	Area	Perimeter
1.0	1.0	4.0
1.0	**1.0**	4.0
.25	.0625	**1.0**

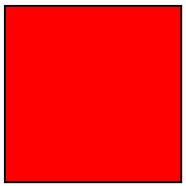


Side	Area	Perimeter
1.0	.4330127019	3.0
1.519671371	**1.0**	4.559014113
.33333333	.1443375672	**1.0**

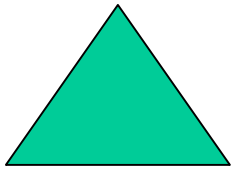
Unit Circles, Unit Squares, and Unit Triangles
The Table of Math Constants in Geometry



Diameter	*Area*	*Circumference*
1.0	**.7853981634**	**3.141592654**
1.128379167	1.0	**3.544907702**
.3183098862	**.0795774716**	1.0



Side	*Area*	*Perimeter*
1.0	**1.0**	**4.0**
1.0	1.0	**4.0**
.25	**.0625**	1.0



Side	*Area*	*Perimeter*
1.0	**.4330127019**	**3.0**
1.519671371	1.0	**4.559014113**
.333333333	**.1443375672**	1.0

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ISBN 58616-217-9