In all cases of comparing circle-type shapes to square shapes with sides equal to the circle's diameter, the square shape can always be divided by a certain constant to receive the dimension of the circle-type shapes. The ratio of the volume of a sphere within a cube will always be approximately 1.9098593171. Take a sphere with a diameter of 10 and a box with the same edge length. 10^3 power is 1000, so that's the volume of the cube. R^3 x Pi = 392.699081699 x (4/3) = 523.598 so the volume of the sphere is 523.598 u^3. 1000/1.909859 = 523.598. You can do this with any sphere/cube. The ratio will always be 1.909859. The implication of this is that you can take the diameter of a sphere, cube it, and divide it by 1.909859 and get it's volume.

A similar principal can also be used for determining circumference of a circle, circle area, sphere surface area, cone volume and surface area, cylander volume and surface area, and ellipse/ellipsoid volume and surface area. The ratio of the area of a square to a circle insciribed within it is 1.27323954474. Take a circle with a diameter of 10. 10^2 is 100, 100/1.2732 = 78.54 or the area of a circle with a diameter of 10. As the surface area of a sphere is 4 x (pi x r^2), and pi x r^2 is the area of a circle, the area of the circle can be found using the constant and multiplied by 4 to get the the surface area of a sphere. The area of a cylander is Pi x r^2 x height, so the area of a circle, and therefore the constant, can be used to determine the volume a cylander by multiplying the area by the height. An alternate way to find the volume of a cylander is to take the diameter squared, multiply it by the height, and divide by 1.27323954474. Circumference uses the same constant as the circle area, and can be determined by taking the diameter of a circle, multiplying by 4 and diving by the constant. Take 7 for instance. 7 x pi = 21.9911485751. 7 x 4 = 28, 28/21.9911 = 1.27323954474. Since you can find the area of a circle on a cylander as well as the circumference of a circle, you can multiply the circumference by the height and the area of the circle by 2 and add them to get the surface area. The volume of a cone can be determined by using the formula 1/3 bh. Use the consant to find the base and solve using that. The volume of a cone can also be calculated by taking the diameter squared times the height and dividing by 3.81971863422. The ratio of a square pyramid's sides to a cone's with a diameter equal to the sides on the base of the square pyramid and equivalent height is 1.27323656735. Therefore, the surface area of a cone is equal to the base + 2(dl) / 1.27323954474.

These same properties can be generalized for Ellipses. 2d Ellipses use the constant 1.27323954474. Take the long diameter of an ellipse and multiply it by the short diameter then divide by 1.27323954474 to get the area of the ellipse. The volume of a 3d Ellipse or Ellipsoid can be calculated by multiplying the 3 diameters by eachother and then diving by 1.909859. Finding the perimiter of an Ellipse or surface area of an Ellipsoid using these constants is impossible. The volume of an Ellipse cylander is the surface area of the Ellipse base x the height. The volume of an Ellipse cylander can also be found by multiplying the 2 diameters and height and then diving by 1.27323656735. As you cannot find the circumference of an ellipse using these constants, you cannot get the surface area or an Ellipse cylander this way. The volume of an Ellipse cone is the surface area of the base x height / 3. The volume of an Ellipse cone can also be found by multiplying the 2 diameters times the height and diving by 3.81971863422. The surface area of an ellipse cone is base + long diameter x length of slant + short diameter x length of slant.

In conclusion, these constants make most uses of Pi obsolete. Any object that uses the area of a circle as it's base calculation will use the main circle constant. Here are the constants and formulas for them,

Sphere constant (S): 1.9098593171

Circle consant (C): 1.27323954474
Cone constant (c): 3.81971863422

Circumference of circle: 4d / C
Circle area: d^2 / C
Cylander volume: d^2/C x h or d^2 x h / C
Cylander surface area: 2(d^2 / C) + (4d / C) x h

Cone volume: d^2/C x h / 3 or d^2 x h / c
Cone surface area: d^2/C + 2dl / C

Sphere volume: d^3 / S
Sphere surface area: 4(d^2/C)

2d Ellipse area: d1 x d2 / C
3d Ellipse/Ellipsoid volume: d1 x d2 x d3 / S

Ellipse Cylander volume: d1 x d2 / C x h or d1 x d2 x h / C

Ellipse Cone volume: d1 x d2 / C x h /3 or d1 x d2 x h / c
Ellipse Cone surface area: d1 x d2 / C + (d1 x l + d2 x l) / C

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