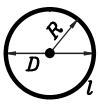
Two-dimensional figures

Circle - common

All points on the circumference of a circle are equidistant from its center.

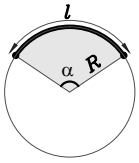


$D=2R$
$l=2\pi R=\pi D$
$A=\pi R^2=\frac{\pi D^2}{4}$

A – Area

Sector of a Circle

The pie-shaped piece of a circle 'cut out' by two radii.

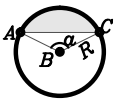


$D=2R$
$l=2\pi R=\pi D$
$A=\pi R^2=\frac{\pi D^2}{4}$

A – Area

Segment of a Circle

Either of the two regions into which which a secant or a chord cuts a circle

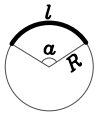


$if\ \alpha<180$
$A=\frac{\pi R^2}{360}\alpha-A_{ABC}$
$if\ \alpha>180$
$A=\frac{\pi R^2}{360}\alpha+A_{ABC}$

A – Area

Arc of a Circle

A curved portion of a circle.

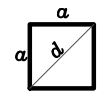


$l=R\,\alpha\frac{\pi}{180}$
$A=\frac{\pi R^2}{360}\alpha$

A – Area

Square

A quadrilateral with opposite sides parallel.

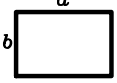


$A=a^2$
$A=\frac{1}{2}d^2$
$P=4*a$
$d=a\sqrt{2}$

P – Perimeter
A – Area

Rectangle

A quadrilateral with adjacent perpendicular (all four angles are are therefore right angles).

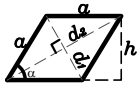


$A=ab$
$A=\frac{1}{2}d^2$
$P=2*(a+b)$

P – Perimeter
A – Area

Rhombus

A parallelogram with all sides equal

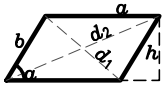


$P=4*a$
$A=ah$
$A=a^2*\sin\alpha$
$A=\frac{1}{2}d_1*d_2$
$d=a\sqrt{2}$
$d_2=2a*\cos\frac{\alpha}{2}$
$d_1=2a*\sin\frac{\alpha}{2}$
$d_1^2+d_2^2=4a^2$

P – Perimeter
A – Area

Parallelogram

A quadrilateral with opposite sides parallel.

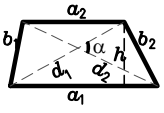


$P=2(a+b)$
$A=a*h$
$d_1^2+d_2^2=2(a^2+b^2)$
$A=ab*\sin\alpha$

P – Perimeter
A – Area

Trapezoid

A quadrilateral with at least one pair of parallel sides

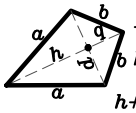


$P=a_1+a_2+b_1+b_2$
$A=\frac{a_1+a_2}{2}h$
$A=\frac{1}{2}d_1*d_2*\sin\alpha$

A – Area
P – Perimeter

Kite

A quadrilateral with two pairs of distinct adjacent sides equal in length.



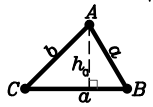
$P=2(a+b)$
$h=\sqrt{a^2-\frac{p^2}{4}}$
$h+q=\sqrt{a^2-\frac{p^2}{4}}+\sqrt{b^2-\frac{p^2}{4}}$

P – Perimeter

Triangle - common

A polygon (plane figure) with 3 angles and 3 sides.

s–semiperimeter of the triangle:



$s=\frac{P}{2}=\frac{a+b+c}{2}$
$A=\frac{1}{2}ah_a$
$A=\frac{1}{2}ab*\sin C$

Heron's formula

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

A – Area
P – Perimeter

Equilateral Triangle

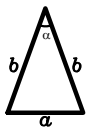
A triangle with all three sides of equal length.

$P=3a$
$R=\frac{a\sqrt{3}}{4}$
$r=\frac{a\sqrt{3}}{6}$
$R=2r$
$A=\frac{a^2}{4}\sqrt{3}$

P – Perimeter
A – Area

Isosceles Triangle

A triangle with two sides of equal length.

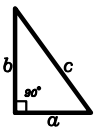


$P=a+2b$
$A=\frac{1}{2}b^2*\sin\alpha$
$A=\frac{a}{4}\sqrt{4b^2-a^2}$

P – Perimeter
A – Area

Right Triangle

A triangle with one right angle.



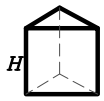
$P=a+b+c$
$c=\sqrt{a^2+b^2}$
$A=\frac{ba}{2}$

P – Perimeter
A – Area

Three-dimensional figures

Prism

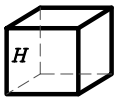
A prism is a solid that has two parallel faces which are congruent polygons at both ends



$V=A*H$

A – Area of base
P – Perimeter of base
V – Volume

Rectangular Parallelepiped



$A=P*H$
$V=A*H$

A – Area of base
P – Perimeter of base
V – Volume

Cone

A cone is a solid with a circular base. It has a curved surface which tapers (i.e. decreases in size) to a vertex at the top.

$V=\frac{1}{3}\pi r^2 H$
$S=\pi rl+\pi r^2$

H – Height
r – Radius of base
S – Surface area
V – Volume
l – the slant height

Frustum of a Right Circular Cone

$V=\frac{1}{3}\pi H(R_1^2+R_2^2+R_1R_2)$
$S=\pi(R_1+R_2)*l$
$S_{tot}=\pi(R_1+R_2)*l$

S_{tot} Total surface area
S – Surface area
$R_1 R_2$ – Radius of bases
l – the slant height
H – Height
V – Volume

Pyramid

A pyramid is a solid with a polygonal base and several triangular lateral faces.

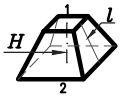
$V=\frac{1}{3}A*H$

S= Add the area of the base to the sum of the areas of all of the triangular faces

A – Area of base
P – Perimeter of base
V – Volume
S – Surface area

Frustum of a Pyramid

The portion of a pyramid that lies between the base and a plane cutting through it parallel to the base.

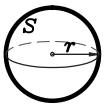


$S=\frac{1}{2}(P_1+P_2)*l$
$V=\frac{1}{3}(A_1+A_2+\sqrt{A_1A_2})*H$

A_1, A_2 – Area of bases
H – Height
P_1, P_2 – Perimeter of bases
l – Slant height
V – Volume
S – Surface area

Sphere

A sphere is a solid in which all the points on the round surface are equidistant from a fixed point, known as the centre of the sphere

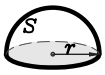


$V=\frac{4}{3}\pi r^3$
$S=4\pi r^2$

V – Volume
r – Radius of base
S – Surface area

Hemisphere

A hemisphere is half a sphere, with one flat circular face and one bowl-shaped face.

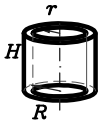


$V=\frac{2}{3}\pi r^3$
$S=2\pi r^2$

V – Volume
r – Radius of base
S – Surface area

Hollow cylinder

$S=2\pi rH+2\pi RH+2(\pi R^2-\pi r^2)$

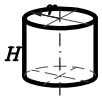


$V=\pi H(R^2-r^2)$

H – Height
R, r – Radius of base
V – Volume
S – Surface area

Cylinder

A cylinder is a solid that has two parallel faces which are congruent circles. The line connecting the centers of the bases is called the axis.



$V=\pi r^2 H$
$S=2\pi r^2+2\pi rh$

H – Height
r – Radius of base
V – Volume
S – Surface area