Mathematics: PROPERTIES OF SHAPES

Area and Perimeter

Shape	Area	Perimeter
Triangle	$A = \frac{1}{2}bh$	$A = s_1 + s_2 + s_3$
Square	$A = s^2$	$A = 4s$
Rectangle	$A = l \times w$	$A = 2l + 2w$
Parallelogram	$A = bh$	$A = s_1 + s_2 + s_3 + s_4$
Trapezoid	$A = \frac{1}{2}h(b_1 + b_2)$	$A = b_1 + b_2 + l_3 + l_4$
Rhombus	$A = \frac{1}{2}d_1 d_2$	$A = 4s$
Circle	$A = \pi r^2$	$A = 2\pi r$

Properties of Quadrilaterals

Parallelogram
Opposite sides are parallel.
Consecutive angles are supplementary.
Opposite angles are equal.
Opposite sides are equal.
Diagonals bisect each other.

Rectangle
All parallelogram properties hold.
Diagonals are congruent and bisect each other.
All angles are right angles.

Square
All rectangle properties hold.
All four sides are equal.
Diagonals bisect angles.
Diagonals intersect at right angles and bisect each other.

Kite
One pair of opposite angles is equal.
Two pairs of consecutive sides are equal.
Diagonals meet at right angles.

Rhombus
All four sides are equal.
Diagonals bisect angles.
Diagonals intersect at right angles and bisect each other.

Trapezoid
One pair of sides is parallel.
Bases have different lengths.
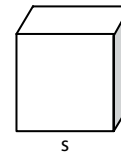
Three-Dimensional Shapes

Prism

$V = Bh$
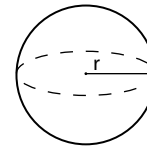$SA = 2lw + 2wh + 2lh$
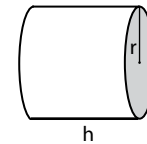$d^2 = a^2 + b^2 + c^2$

Cube

$V = s^3$
$SA = 6s^2$
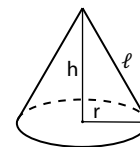
Sphere

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

Cylinder

$V = Bh = \pi r^2 h$
$SA = 2\pi r^2 + 2\pi rh$

Cone

$V = \frac{1}{3}\pi r^2 h$

Pyramid

$V = \frac{1}{3}Bh$

B = area of base	d = diagonal
h = height	s = cube edge
l = length	r = radius
w = width	ℓ = slant height