Perimeter, Area, Surface Area, and Volume:
Review of Terminology, Basic Shapes, and Formulas

TERMINOLOGY

area: the measure of a bounded region of a two-dimensional shape expressed in square units

circumference: the distance around the edge of a circle

diameter: the distance across a circle through its center point

hypotenuse: the side opposite the 90° angle in a right triangle, also the longest side of a right triangle

perimeter: the total distance around the outside of a polygon

pi or π: the circumference of any circle divided by its diameter, rounded to the number 3.14

radius: the measure from the center of a circle to a point on the circle

slant: the diagonal distance from the top of a cone to its base

slant height: the height of one of the triangular faces of a pyramid

surface area: the sum of all the areas of all surfaces of a three-dimensional object, measured in square units

volume: the amount of space inside a three-dimensional shape, measured in cubic units

ABBREVIATIONS:	d = diameter	r = radius
A = area	h = height	SA = surface area
b = base	l = length	slant h = slant height
BA = base area	P = perimeter	V = volume
C = circumference	π = pi = 3.14	w = width

BASIC SHAPES AND FORMULAS

2D SHAPES: PERIMETER AND AREA

Rectangle
$P = 2 \cdot (l + w)$
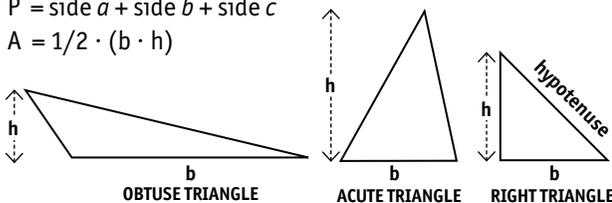$A = l \cdot w$

Triangle
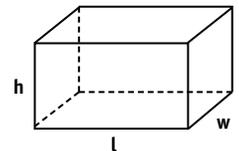$P = \text{side } a + \text{side } b + \text{side } c$
$A = 1/2 \cdot (b \cdot h)$

OBTUSE TRIANGLE ACUTE TRIANGLE RIGHT TRIANGLE

Circle
$C = \pi \cdot d$
$A = \pi \cdot r^2$

Trapezoid
$P = \text{side } a + b1 + b2 + \text{side } c$
$A = 1/2 \cdot (b1 + b2) \cdot h$

3D SHAPES: SURFACE AREA AND VOLUME

Rectangular Prism
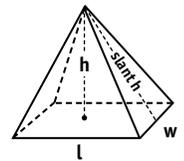$SA = 2 \cdot (l \cdot w + l \cdot h + w \cdot h)$
$V = l \cdot w \cdot h$

Square Pyramid
$SA = (BA) + 1/2 \cdot P \cdot \text{slant h}$
$V = 1/3 \cdot BA \cdot h$

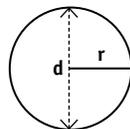*Note: base area (BA) of a square or rectangular pyramid is l · w of the base, and P is perimeter of the base.*
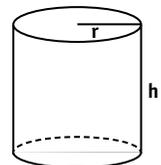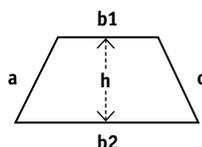
Cylinder
$SA = (2 \cdot \pi \cdot r^2) + (\pi \cdot d \cdot h)$
$V = \pi \cdot r^2 \cdot h$

Cone
$SA = (\pi \cdot r^2) + (\pi \cdot r \cdot \text{slant})$
$V = \pi \cdot 1/3 \cdot r^2 \cdot h$