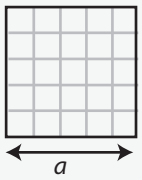
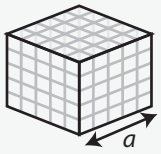
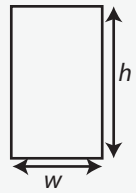
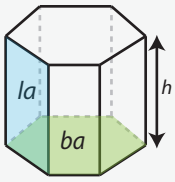
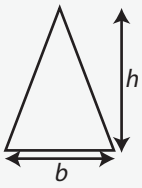
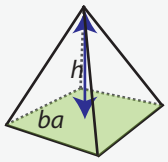
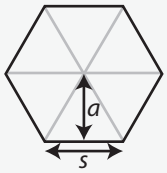
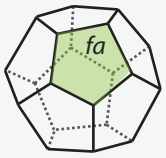
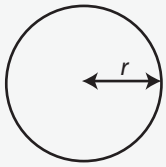
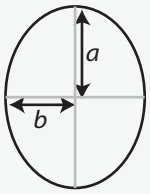
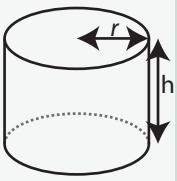
SKILLSYOUNEED
Helping You Develop Life Skills

Area, Surface Area & Volume
reference sheet

Two-dimensional plane shapes	**Area** *The measure of how many squares will fit into a shape.* ***Units²***	Three-dimensional solid shapes	**Surface Area** *The measure of the area of all outward facing sides.* ***Units²***	**Volume** *The measure of how many cubes will fit into a shape.* ***Units³***
Square 	Area = a^2 or $a \times a$ **Example:** *a = 5cm* *Area = 5^2 = 25cm²*	**Cube** 	Surface Area = $6 \times a^2$ **Example:** *a = 5cm* *Surface Area = 150cm²*	Volume = a^3 or $a \times a \times a$ **Example:** *a = 5cm.* *Volume = 125cm³*
Rectangle 	Area = $w \times h$ **Example:** *w = width=10cm* *height=20cm* *Area =10 × 20 = 200cm²*	**Prism** 	Surface Area = $2 \times ba + la$ **Example:** *ba = base area = 20cm²* *la = lateral area (all sides) = 60cm²* *Surface area =* *2 × 20 + 60 = 100cm²*	Volume = ba × h **Example:** *ba = base area = 20cm²* *h = height = 5cm* *Volume = 20 × 5 = 100cm³*
Triangle 	Area = $b \times h \times 0.5$ **Example:** *b = base = 20cm* *h = vertical height = 15cm* *Area = 20 × 15 × 0.5 =150cm²*	**Pyramid** 	Surface Area = ba + la **Example:** *ba = base area = 16cm²* *la = lateral area (all sides) = 60cm²* *Surface area = 16 + 60 = 76cm²*	Volume = ba × h × 1/3 **Example:** *ba = base area = 16cm²* *h = height = 9cm* *Volume = 16 × 9 × 1/3 = 48cm³*
Reg Polygon 	Area = $n \times s \times a \times 0.5$ **Example:** *n = number of sides = 6* *length of side=5cm* *a = apothem=15cm* *Area = 6 × 5 × 15 × 0.5 = 225cm²*	**R. Polyhedron** 	Surface Area = fa × s **Example:** *fa = area of one side = 200cm²* *s = number of sides = 12* *Surface area = 200 × 12 = 2400cm²*	**Example:** *There is no simple generic formula for working out the volume of a regular polyhedron.*
Circle 	Area = $\pi \times r^2$ **Example:** *π = pi = 3.14* *r = radius = 5cm* *Area = 3.14 × 5^2 = 3.14 × 5 × 5 = 78.5cm²*	**Sphere** 	Surface Area = $4 \times \pi \times r^2$ **Example:** *r = radius = 4.5cm* *Surface area = 4 × 3.14 × 20.25 = 254.5 cm² (Approx)*	Volume = $4/3 \times \pi \times r^3$ **Example:** *r = radius = 4.5cm* *Volume = 4/3 × 3.14 × 4.5^3 = 381.5cm³ (Approx)*
Ellipse 	Area = $\pi \times a \times b$ **Example:** *π = pi = 3.14* *a = radius of long axis = 6* *b = radius short axis = 4* *Area = 3.14 × 6 × 4 × 5 = 75.36cm²*	**Cylinder** 	Surface Area = $2\pi rh + 2\pi r^2$ **Example:** *r = radius = 5cm* *h = height = 10cm* *Surface area = 2 × 3.14 × 5 × 10 + 2 × 3.14 × 25 = 471cm²*	Volume = $\pi \times r^2 \times h$ **Example:** *r = radius = 5cm* *h = height = 10cm* *Volume = 3.14 × 25 × 10 = 785cm³ (Approx)*

Definitions

Apothem: The line connecting the centre of a regular polygon with one of its sides. The line is perpendicular (at a right angle) to the side.

Axis: A line of reference about which an object, point or line is drawn, rotated or measured. In a symmetrical shape, an axis is usually a line of symmetry.

Radius: The distance from the geometric centre of a curved shape to its circumference (edge).

For more information and examples of these calculations see: Calculating Area, Three-Dimensional Shapes and Calculating Volume.

© 2020 SkillsYouNeed.com