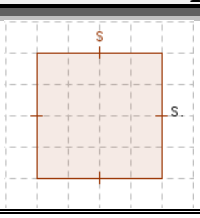
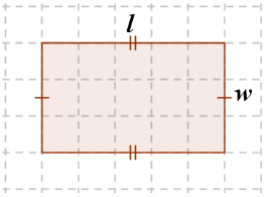
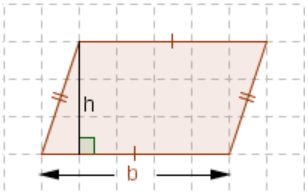
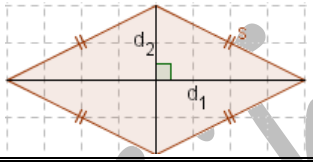
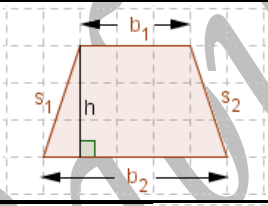
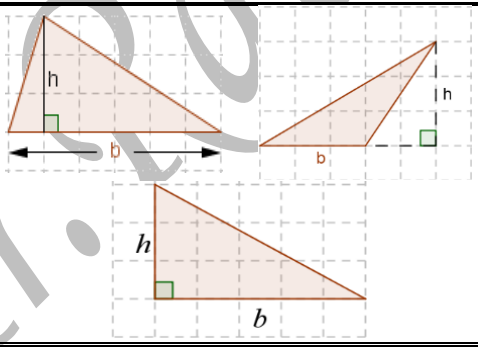
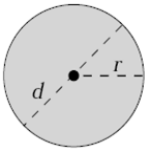
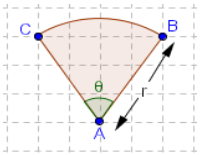
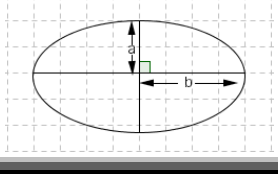
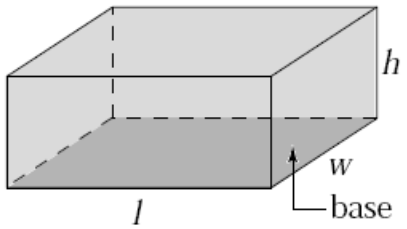
Names	Geometric shapes	Area	Perimeter
Square		$A = s \times s = s^2.$	$P = 4s.$
Rectangle		$A = l \times w.$	$P = 2l + 2w$ $= 2(l + w).$
Parallelogram		$A = b \times h.$	$P =$ *sum of all sides.* *OR* $P = 2(l + w).$
Rhombus		$A = \frac{d_1 \times d_2}{2}.$	$P = 4s.$
Trapezoid		$A = \frac{h}{2}(b_1 + b_2).$	$P = (s_1 + s_2) + (b_1 + b_2)$
Triangle		$A = \frac{1}{2}(b \times h).$	$P =$ *sum of all sides.*
Circle		$A = \pi \times r^2$ $A = \pi \times \frac{d^2}{4}$	$C = 2\pi \times r$ $C = \pi \times d.$
Circular sector		$A = \pi r^2 \times \frac{\theta}{360^\circ}$	$C = 2\pi \times r \times \frac{\theta}{360^\circ}$
An Ellipse		$A = \pi(a \times b)$	

Volumes of solid figures

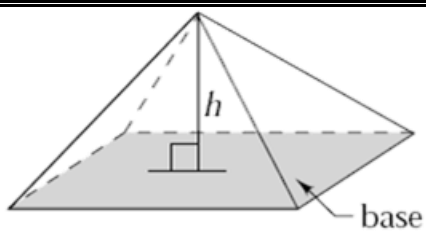
Rectangular prism



$P = 2P_B + 4h.$

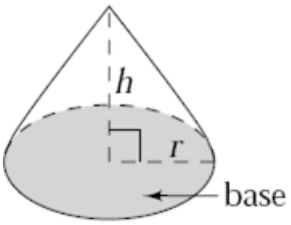
$V = l \times w \times h.$ or $V = Area_{base} \times h.$

Pyramid



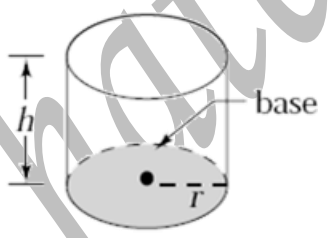
$V = \frac{1}{3} B \times h.$

Cone



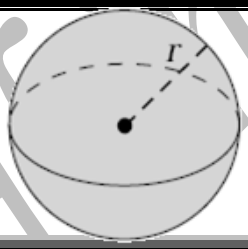
$V = \frac{1}{3} B \times h.$ OR $V = \frac{h}{3}(\pi r^2)$

Cylinder



$V = B \times h.$ OR $V = h \times \pi r^2$

Sphere



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

Note that:

l: length	d: diameter	r: radius	P: perimeter
w: width	h: height	V: volume	
s: side	b: base	B: area of base	

12.2 Area of a Triangle — by Heron's Formula

Heron was born in about 10AD possibly in Alexandria in Egypt. He worked in applied mathematics. His works on mathematical and physical subjects are so numerous and varied that he is considered to be an encyclopedic writer in these fields. His geometrical works deal largely with problems on mensuration written in three books. Book I deals with the area of squares, rectangles, triangles, trapezoids (trapezia), various other specialised quadrilaterals, the regular polygons, circles, surfaces of cylinders, cones, spheres etc. In this book, Heron has derived the famous formula for the area of a triangle in terms of its three sides.

Heron (10AD – 75AD)
Fig. 12.4

The formula given by Heron about the area of a triangle, is also known as *Hero's formula*. It is stated as:

Area of a triangle $= \sqrt{s(s-a)(s-b)(s-c)}$ (II)

where a, b and c are the sides of the triangle, and *s = semi-perimeter i.e. half the perimeter of the triangle* $= \frac{a+b+c}{2}$.