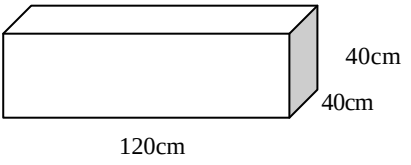
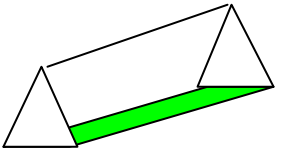
Tutorial 14 Mensuration

1. Find the area of the following figures:
   a. A triangle with base = 10 cm and height = 5 cm
   b. A circle with diameter = 10 cm
   c. A trapezium with height = 8 cm, length of two parallel sides are 10 cm and 18 cm respectively
   d. A sector of radius 12 cm and sector angle = 45^{o}.

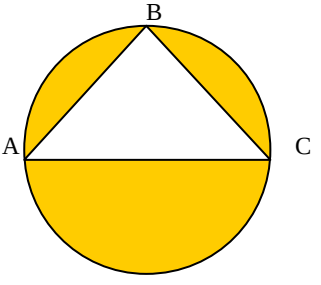
2. The internal measurements of a rectangular box 40cm x 120cm x 40cm. Three spheres of radius 20cm just fit in the box.
   a. Calculate the volume of one sphere.
   b. Calculate the unoccupied volume in the box.



3. A triangular prism has two parallel equilateral triangular faces. The length of one side of the triangular faces is 4cm. The length of the prism is 15 cm. a. Find the volume of the prism.
   b. Find the total surface area of the prism.



4. ABC is an isosceles triangle inscribed in a circle such that A,B and C are points on the circumference of the circle. AC is a diameter, AB =BC =10cm. Find the area of the shaded portion.



Solutions

1a..Area = $\frac{1}{2}$ base x height A= $\frac{1}{2}$ 10 x 5=25 cm^2

1b. Area = $\pi r^2 = \pi 5^2 = 78.5\ cm^2$

1c. Area = $\frac{h}{2}(a+b) = \frac{8}{2}(10+18) = 112\ cm^2$

1d.Area= $\frac{1}{2}r^2 q = \frac{1}{2}12^2 \frac{45p}{180} = 18p$ cm^2

2a. Volume of sphere = $\frac{4}{3}p(20)^3 = 33510.3\ cm^2$

2b. Unoccupied volume = 1200 x 40 x 40 – 3(33510.3) = 91469 cm^2

3a. Volume of prism = X-sectional area x length

= $\frac{1}{2}4*4\sin 60^o(15) = 103.9$ cm^2

3b. Total surface area = 2*($\frac{1}{2}4*4\sin 60^o$)+3*(4x15)

= 193.8 cm^2

4. Area of ? ABC = $\frac{1}{2}(10)(10) = 50\ cm^2$ (since ? ABC is a right angle)

radius of circle = $\frac{1}{2}\sqrt{10^2+10^2} = \frac{1}{2}\sqrt{200}$

Area of the shaded portion = $p(\frac{1}{2}\sqrt{200})^2 = 50p - 50$

= 50 (π- 1) = 107.1 cm^2