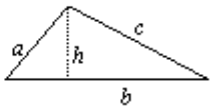
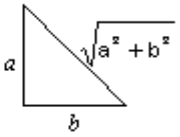
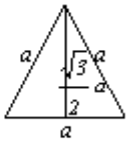
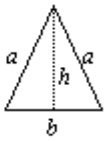
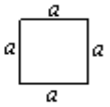
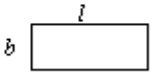
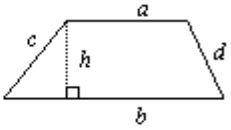
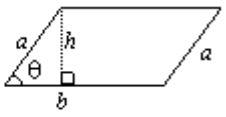
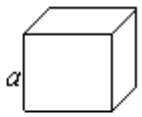
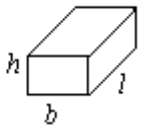
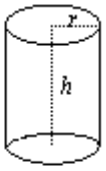
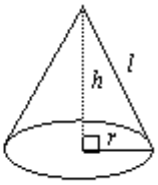
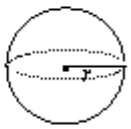
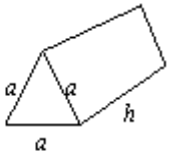
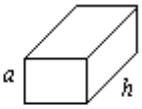
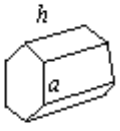
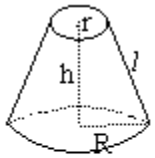
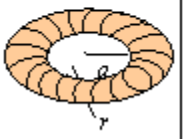
# CAT Geometry Formulas

## Plane Figures

| Figure | Perimeter | Area | |
|---|---|---|---|
| Triangle | $= a + b + c$ | $\sqrt{s(s-a)(s-b)(s-c)}$ $\frac{1}{2}bh$ |   |
| Peri Right angled triangle meter | $a + b + \sqrt{a^2 + b^2}$ | $\frac{1}{2}ab$ |   |
| Equilateral triangle | $3a$ | $\frac{\sqrt{3}}{4}a^2$ |   |
| Isoceles triangle | $2a + b$ | $\frac{b}{4}\sqrt{4a^2 - b^2}$ |   |
| Circle | $2\pi r$ | $\pi r^2$ |   |
| Sector of a circle | $\frac{\theta}{360} \times 2\pi r + 2r$ (θ is in degrees)r | $\frac{\theta}{360} \times \pi r^2$ |   |
| Square | $4a$ | $a^2$ |   |
| Rectangle | $2(l + b)$ | lb |   |
| Trapezium | $a + b + c + d$ | $\frac{1}{2}(a+b)h$ |   |
| Parallelogram | $2(a + b)$ | bh or $\frac{1}{2}ab\sin\theta$ |   |

## Solids

| Figure | Lateral Surface Area | Total Surface Area | Volume | |
|---|---|---|---|---|
| Cube | $4a^2$ | $6a^2$ | $a^3$ |   |
| Cuboid | $2h(l+b)$ | $2(lb+bh+lh)$ | $lbh$ |   |
| Cylinder | $2\pi rh$ | $2\pi r(r+h)$ | $\pi r^2 h$ |   |
| Cone | $\pi rl$ | $\pi r(l+r)$ | $\frac{1}{3}\pi r^2 h$ |   |
| Sphere | – | $4\pi r^2$ | $\frac{4}{3}\pi r^3$ |   |
| Hemisphere | $2\pi$ | $3\pi r^2$ | $\frac{2}{3}\pi r^3$ |   |
| Right prism<br>(i) Equilateral triangular prism | 3ah | $3ah+\frac{\sqrt{3}}{2}a^2$ | $\frac{\sqrt{3}}{4}a^2 h$ |   |
| (ii) Square prism | 4ah | 2ah (2h + a) | $a^2h$ |   |
| (iii) Hexagonal Prism | 6ah | $3a\left[\frac{\sqrt{3}}{2}a+2h\right]$ | $\frac{3\sqrt{3a^2}h}{2}$ |   |

| | | | | |
|---|---|---|---|---|
| Frustum of a cone | $\pi l(R+r)$<br>$l=\sqrt{(R-r)^2+h^2}$ | $\pi(R^2+r^2+Rl+rl)$ | $\frac{1}{3}\pi h(R^2+Rr+r^2)$ |  |
| Frustum of a Pyramid | $\frac{1}{2}$ × Perimeter of base × Slant height | L.S.A + $A_1$ + $A_2$ | $\frac{1}{2}h$<br>$(A_1+A_2+\sqrt{A_1A_2})$ |  |
| Torus | Frustum of a cone | $4\pi^2ra$ | $2\pi^2r^2a$ |  |

**NOTE:** (3.14) is an approximation of pi.

## Coordinate Geometry

**The Distance Between Two Points A and B:**

- $AB^2 = (Bx - Ax)^2 + (By - Ay)^2$

**The Equation of a Line Using One Point and the Gradient**

The equation of a line that has gradient m and which passes through the point (x1, y1) is:

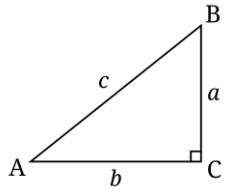
- $y - y1 = m(x - x1)$

**The Midpoint of a Line Joining Two Points**

The midpoint of the line joining the points (x1, y1) and (x2, y2) is:

- [½(x1 + x2), ½(y1 + y2)]

## Trigonometry




- sin A = Perpendicular / Hypoteneuse = a / c
- cos A = Base / Hypoteneuse = b / c
- tan A = Perpendicular / Base = a / b
- cot A = 1 / tan A
- sec A = 1 / cos A
- cosec A = 1 / sin A

**Trigonometric Identities:**

- Sine=Opposite/Hypotenuse
- Cosine=Adjacent/Hypotenuse
- Tangent=Opposite/Adjacent
- Secant=Hypotenuse/Adjacent
- Co−Secant=Hypotenuse/Opposite
- Co−Tangent=Adjacent/Opposite

**The reciprocal identities:**

- sinΘ=1/CosecΘ
- cosΘ=1/secΘ
- tanΘ=1/cotΘ
- CosecΘ=1/sinΘ
- secΘ=1/cosΘ
- cotΘ=1/tanΘ