Mensuration is the branch of mathematics which deals with the study of Geometric shapes, their area, volume and related parameters.

Some important **mensuration formulas** are:

1. Area of rectangle (A) = length(l) × Breath(b)

$$A = l \times b$$

2. Perimeter of a rectangle (P) = 2 × (Length(l) + Breath(b))

$$P = 2 \times (l + b)$$

3. Area of a square (A) = Length (l) × Length (l)

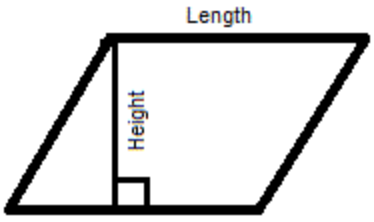
$$A = l \times l$$

4. Perimeter of a square (P) = 4 × Length (l)

$$P = 4 \times l$$

5. Area of a parallelogram(A) = Length(l) × Height(h)

$$A = l \times h$$

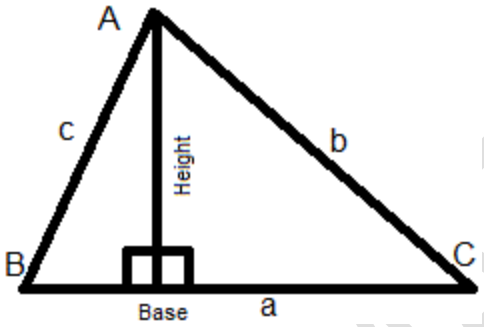


6. Perimeter of a parallelogram (P) = 2 × (length(l) + Breadth(b))

$$P = 2 \times (l + b)$$

7. Area of a triangle (A) = (Base(b) × Height(b)) / 2

$$A = \frac{1}{2} \times b \times h$$



And for a triangle with sides measuring "a" , "b" and "c" , Perimeter = a+b+c

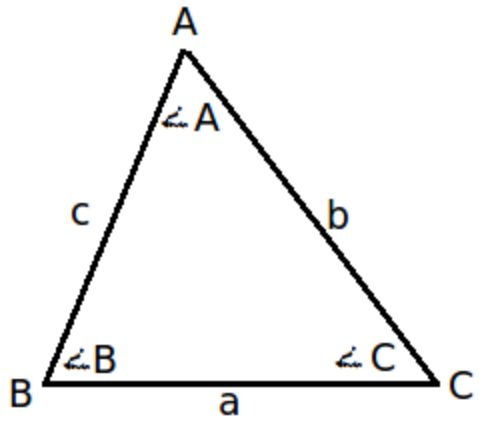
and s = semi perimeter = perimeter / 2 = (a+b+c)/2

And also: Area of triangle = $A = \sqrt{s(s-a)(s-b)(s-c)}$

This formulas is also knows as "Heron's formula".

8. Area of triangle(A) =

Where A, B and C are the vertex and angle A , B , C are respective angles of triangles and a , b , c are the respective opposite sides of the angles as shown in figure below:



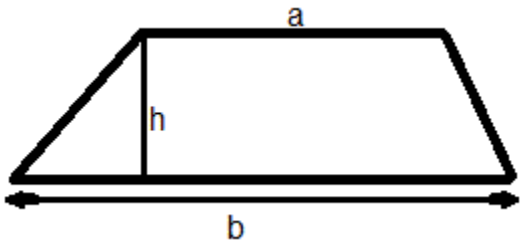
area of triangle - mensuration

9. Area of isosceles triangle = $\frac{b}{4}\sqrt{4a^2 - b^2}$

Where a = length of two equal side , b= length of base of isosceles triangle.

10. Area of trapezium (A) = $\frac{1}{2}(a + b) \times h$

Where "a" and "b" are the length of parallel sides and "h" is the perpendicular distance between "a" and "b" .



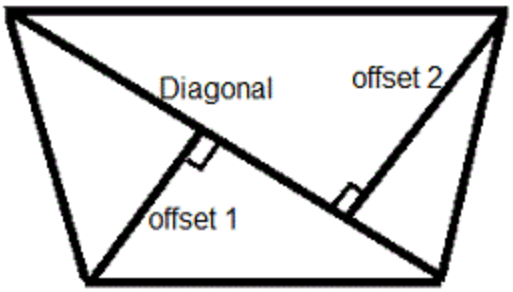
11. Perimeter of a trapezium (P) = sum of all sides

12. Area of rhombus (A) = Product of diagonals / 2

13. Perimeter of a rhombus (P) = 4 × l

where l = length of a side

14. Area of quadrilateral (A) = 1/2 × Diagonal × (Sum of offsets)



15. Area of a Kite (A) = 1/2 × product of it's diagonals

16. Perimeter of a Kite (A) = 2 × Sum on non-adjacent sides

17. Area of a Circle (A) = $\pi r^2 = \frac{\pi d^2}{4}$

Where r = radius of the circle and d = diameter of the circle.

18. Circumference of a Circle = $2\pi r = \pi d$

r= radius of circle

d= diameter of circle

19. Total surface area of cuboid = $2(lb + bh + lh)$

where l= length , b=breadth , h=height

20. Total surface area of cuboid = $6l^2$

where l= length

21. length of diagonal of cuboid = $\sqrt{l^2 + b^2 + h^2}$

22. length of diagonal of cube = $\sqrt{3l}$

23. Volume of cuboid = l × b × h

24. Volume of cube = l × l × l

25. Area of base of a cone = πr^2

26. Curved surface area of a cone = C = $\pi \times r \times l$

Where r = radius of base , l = slanting height of cone

27. Total surface area of a cone = $\pi r(r + l)$

28. Volume of right circular cone = $\frac{1}{3}\pi r^2 h$

Where r = radius of base of cone , h= height of the cone (perpendicular to base)

29. Surface area of triangular prism = (P × height) + (2 × area of triangle)

Where p = perimeter of base

30. Surface area of polygonal prism = (Perimeter of base × height) + (Area of polygonal base × 2)

31. Lateral surface area of prism = Perimeter of base × height

32. Volume of Triangular prism = Area of the triangular base × height

33. Curved surface area of a cylinder = $2\pi rh$

Where r = radius of base, h = height of cylinder

34. Total surface area of a cylinder = $2\pi r(r+h)$

35. Volume of a cylinder = $\pi r^2 h$

36. Surface area of sphere = $4\pi r^2 = \pi d^2$

where r= radius of sphere, d= diameter of sphere

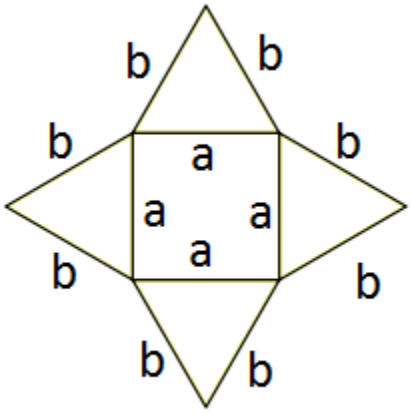
37. Volume of a sphere = $\frac{4}{3}\pi r^3 = \frac{1}{6}\pi d^3$

38. Volume of hollow cylinder = $\pi rh(R^2 - r^2)$

where , R = radius of cylinder , r= radius of hollow , h = height of cylinder

39. Right Square Pyramid:

If a = length of base , b= length of equal side ; of the isosceles triangle forming the slanting face , as shown in figure:



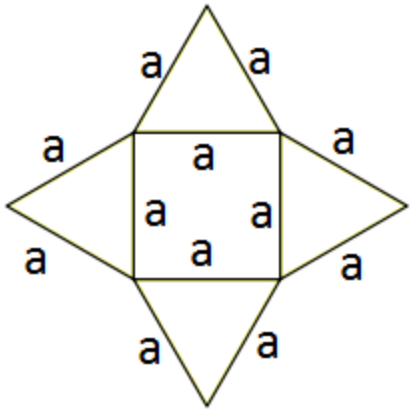
net diagram of right square pyramid

39.a Surface area of a right square pyramid = $a\sqrt{4b^2 - a^2}$

39.b Volume of a right square pyramid = $\frac{1}{2} \times base\ area \times height$

40. Square Pyramid:

40.a. Johnson Pyramid:



net diagram of johnson pyramid

Volume = $(1+\sqrt{3}) \times a^2$

Total Surface Area: $\frac{\sqrt{2}}{6} \times a^3$

40.b. Normal Square pyramid:

If a = length of square base and h = height of the pyramid then:

Volume = $V = \frac{1}{3}a^2h$

Total Surface Area = $a^2 + a\sqrt{a^2 + (2h)^2}$

41. Area of a regular hexagon = $\frac{3\sqrt{3}a^2}{2}$

42. area of equilateral triangle = $\frac{\sqrt{3}}{4}a^2$

43. Curved surface area of a Frustums = $\pi h(r_1 + r_2)$

44. Total surface area of a Frustums = $\pi(r_1^2 + h(r_1 + r_2) + r_2^2)$

45. Curved surface area of a Hemisphere = $2\pi r^2$

46. Total surface area of a Hemisphere = $3\pi r^2$

47. Volume of a Hemisphere = $\frac{2}{3}\pi r^3 = \frac{1}{12}\pi d^3$

48. Area of sector of a circle = $\frac{\theta r^2 \pi}{360}$

where θ = measure of angle of the sector , r= radius of the sector