**Chapter wise Formulas for class 10th**

* **Chapter 1: Real Numbers**
  + Euclid's Division Lemma: a = bq + r, where 0 ≤ r < b
  + Fundamental Theorem of Arithmetic: Every composite number can be expressed as a product of primes, and this factorization is unique.
* **Chapter 2: Polynomials**
  + Relationship between zeros and coefficients of a quadratic polynomial:
    - Sum of zeros: -b/a
    - Product of zeros: c/a
  + For a quadratic polynomial: ax² + bx + c
* **Chapter 3: Pair of Linear Equations in Two Variables**
  + Conditions for consistency and inconsistency of linear equations:
    - a1/a2 ≠ b1/b2 (intersecting lines, unique solution)
    - a1/a2 = b1/b2 = c1/c2 (coincident lines, infinitely many solutions)
    - a1/a2 = b1/b2 ≠ c1/c2 (parallel lines, no solution)
* **Chapter 4: Quadratic Equations**
  + Standard form: ax² + bx + c = 0
  + Quadratic formula: x = [-b ± √ (b² - 4ac)] / 2a
  + Discriminant: D = b² - 4ac
    - D > 0 (two distinct real roots)
    - D = 0 (two equal real roots)
    - D < 0 (no real roots)
* **Chapter 5: Arithmetic Progressions**
  + nth term: an = a + (n - 1) d
  + Sum of n terms: Sn = n/2 [2a + (n - 1) d] or Sn = n/2 (a + an)
* **Chapter 6: Triangles**
  + Basic Proportionality Theorem (Thales' Theorem)
  + Pythagoras Theorem: In a right-angled triangle, hypotenuse² = base² + perpendicular²
* **Chapter 7: Coordinate Geometry**
  + Distance formula: √ [(x2 - x1) ² + (y2 - y1) ²]
  + Section formula:
    - Coordinates of P (x, y) dividing the line segment joining A(x1, y1) and B(x2, y2) in the ratio m:n are:
      * x = (mx2 + nx1) / (m + n)
      * y = (my2 + ny1) / (m + n)
  + Midpoint formula: ((x1+x2)/2, (y1+y2)/2)
* **Chapter 8: Introduction to Trigonometry**
  + Trigonometric ratios: sin θ, cos θ, tan θ, cosec θ, sec θ, cot θ
  + Trigonometric identities:
    - sin² θ + cos² θ = 1
    - 1 + tan² θ = sec² θ
    - 1 + cot² θ = cosec² θ
* **Chapter 10: Circles**
  + Tangents and their properties.
* **Chapter 11: Constructions**
  + This chapter is mainly about construction methods. So, it is more about the process than strict formulas.
* **Chapter 12: Areas Related to Circles**
  + Area of a circle: πr²
  + Circumference of a circle: 2πr
  + Area of a sector: (θ/360) × πr²
  + Length of an arc: (θ/360) × 2πr
* **Chapter 13: Surface Areas and Volumes**

**1. Cuboid:**

* **Volume:** l × b × h (length × breadth × height)
* **Total Surface Area (TSA):** 2(lb + bh + lh)
* **Lateral Surface Area (LSA):** 2h (l + b)

**2. Cube:**

* **Volume:** a³ (side³)
* **TSA:** 6a²
* **LSA:** 4a²

**3. Cylinder:**

* **Volume:** πr²h (π × radius² × height)
* **Curved Surface Area (CSA):** 2πrh
* **TSA:** 2πr (r + h)

**4. Cone:**

* **Volume:** (1/3) πr²h
* **CSA:** πrl (where l is the slant height)
  + l = √ (r² + h²)
* **TSA:** πr (r + l)

**5. Sphere:**

* **Volume:** (4/3) πr³
* **TSA:** 4πr²

**6. Hemisphere:**

* **Volume:** (2/3) πr³
* **CSA:** 2πr²
* **TSA:** 3πr²

**Key Points to Remember:**

* **π (pi):** Approximately 3.14 or 22/7.
* **l (slant height):** Important for cones and frustums.
* **Chapter 14: Statistics**
  + Mean:
    - Direct method: Σfixi / Σfi
    - Assumed mean method: a + Σfidi / Σfi
    - Step deviation method
  + Median: l + [(n/2 - cf) / f] × h
  + Mode: l + [(f1 - f0) / (2f1 - f0 - f2)] × h
* **Chapter 15: Probability**
  + Probability of an event: Number of favourable outcomes / Total number of outcomes