Geometry & Mensuration: Formula Cheat Sheet + Practice Questions

2D Geometry (Plane Figures)

1. Square: Area = a^2, Perimeter = 4a, Diagonal = a * sqrt(2)
2. Rectangle: Area = l * b, Perimeter = 2(l + b), Diagonal = sqrt(l^2 + b^2)
3. Triangle: Area = 1/2 * b * h, Heron's Area = sqrt[s(s-a)(s-b)(s-c)], s = (a+b+c)/2
4. Right-Angled Triangle: Hypotenuse = sqrt(base^2 + height^2)
5. Circle: Area = pi * r^2, Circumference = 2 * pi * r, Diameter = 2r
6. Semi-Circle: Area = 1/2 * pi * r^2, Perimeter = pi * r + 2r
7. Parallelogram: Area = b * h, Perimeter = 2(a + b)
8. Rhombus: Area = 1/2 * d1 * d2, Perimeter = 4a
9. Trapezium: Area = 1/2(a + b) * h (a & b are parallel sides)

3D Geometry (Mensuration)

1. Cube: Surface Area = 6a^2, Volume = a^3, Diagonal = a * sqrt(3)
2. Cuboid: Surface Area = 2(lb + bh + hl), Volume = l * b * h, Diagonal = sqrt(l^2 + b^2 + h^2)
3. Cylinder: CSA = 2 * pi * r * h, TSA = 2 * pi * r(h + r), Volume = pi * r^2 * h
4. Cone: Slant Height = sqrt(r^2 + h^2), CSA = pi * r * l, TSA = pi * r(l + r), Volume = (1/3) * pi * r^2 * h
5. Sphere: Surface Area = 4 * pi * r^2, Volume = (4/3) * pi * r^3
6. Hemisphere: CSA = 2 * pi * r^2, TSA = 3 * pi * r^2, Volume = (2/3) * pi * r^3
7. Frustum of Cone: Volume = (1/3) * pi * h(R^2 + r^2 + R * r), CSA = pi(R + r) * l, TSA = pi(R + r) * l + pi * R^2 + pi * r^2

Constants: pi ~ 3.1416 or 22/7, sqrt(2) ~ 1.41, sqrt(3) ~ 1.73

Practice Questions (Answers at End)

1. Area of a square of side 6 cm?
2. Volume of cube with side 5 cm?
3. Diagonal of a rectangle (l=8, b=6)?
4. Area of circle with radius 7 cm?
5. Volume of a cone (r=3, h=4)?
6. Surface area of a cuboid (l=4, b=3, h=2)?
7. Perimeter of rhombus with side 9 cm?
8. Heron's area of triangle (sides 7, 8, 9)?
9. TSA of hemisphere with radius 5 cm?
10. CSA of cylinder (r=3, h=10)?

11. Volume of frustum (R=4, r=2, h=6)?
12. Perimeter of semi-circle with r=14 cm?
13. Volume of sphere with radius 3 cm?
14. Area of parallelogram (b=5, h=8)?
15. TSA of cone (r=3, h=4)?
16. Area of trapezium (a=6, b=10, h=5)?
17. Area of equilateral triangle with side 6 cm?
18. Surface area of cube with side 9 cm?
19. Diagonal of cube with side 6 cm?
20. CSA of cone with r=4 cm, h=3 cm?

Answers:

1. 36 cm^2 2. 125 cm^3 3. 10 cm 4. 154 cm^2 5. 12 * pi cm^3
6. 52 cm^2 7. 36 cm 8. ~26.83 cm^2 9. 235.5 cm^2 10. 188.4 cm^2
11. ~301.59 cm^3 12. 72 cm 13. 113.1 cm^3 14. 40 cm^2 15. ~75.4 cm^2
16. 40 cm^2 17. ~15.6 cm^2 18. 486 cm^2 19. ~10.4 cm 20. ~75.4 cm^2