

1. $a^2 - b^2 = (a+b)(a-b)$
2. $(a+b)^2 = a^2 + 2ab + b^2$
3. $(a-b)^2 = a^2 - 2ab + b^2$
4. $(a+b)^3 = a^3 + 3ab(a+b) + b^2$ Or $a^3 + 3a^2b + 3ab^2 + b^3$
5. $(a-b)^3 = a^3 - 3ab(a-b) - b^3$ Or $a^3 - 3a^2b + 3ab^2 - b^3$
6. $a^3 + b^3 = (a+b)(a^2 - ab + b^2)$ Or $(a+b)^3 - 3ab(a+b)$
7. $a^3 - b^3 = (a-b)(a^2 + ab + b^2)$ Or $(a-b)^3 + 3ab(a-b)$
8. $(a+b+c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$ Or $a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$
9. $(-a-b-c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$ Or $a^2 + b^2 + c^2 + 2(ab + bc + ca)$
10. $a^3 + b^3 + c^3 - 3abc = (a+b+c)(a^2 + b^2 + c^2 - ab - bc - ca)$
11. $(x+a)(x+b) = x^2 + (a+b)x + ab$
12. $(x+a)(x+b)(x+c) = x^3 + (a+b+c)x^2 + (ab + bc + ca)x + abc$
13. $a^m \times a^n = a^{m+n}$
14. $a^m \div a^n = a^{m-n}$
15. $a^{-n} = 1/a^n$
16. $1/a^{-n} = a^n$
17. LSA of a cuboid $= 2h(l+b)$
18. TSA of a cuboid $= 2(lb + bh + hl)$
19. Volume of a cuboid $= l.b.h$
20. Diagonal of a cuboid $= \sqrt{l^2 + b^2 + h^2}$
21. LSA of a cube $= 4a^2$
22. TSA of a cube $= 6a^2$
23. Volume of a cube $= a^3$
24. Diagonal of a cube $= a\sqrt{3}$ or $\sqrt{3}.a$
25. CSA of a cylinder $= 2\pi rh$
26. TSA of a cylinder $= 2\pi r(h+r)$
27. Volume of a cylinder $= \pi r^2 h$
28. CSA of a cone $= \pi rl$
29. TSA of a cone $= \pi r(l+r)$
30. Volume of a cone $= \frac{1}{3} \pi r^2 h$
31. CSA of a sphere $= 4\pi r^2$

32. TSA of a sphere = $4\pi r^2$
33. Volume of a sphere = $\frac{4}{3}\pi r^3$
34. CSA of a hemisphere = $2\pi r^2$
35. TSA of a hemisphere = $3\pi r^2$
36. Volume of a hemisphere = $\frac{2}{3}\pi r^3$
37. LSA of a hollow cylinder = $2\pi h(R + r)$
38. TSA of a hollow cylinder = $2\pi h(R + r) (h + R - r)$
39. Volume of a hollow cylinder = $\pi h (R^2 - r^2)$
40. Volume of a hollow sphere = $\frac{4}{3} \pi (R^3 - r^3)$
41. Volume of a hollow hemisphere = $\frac{2}{3} \pi (R^3 - r^3)$
42. Area (right triangle) = $\frac{1}{2} \times b \times h$
43. Area (isosceles triangle) = $\frac{1}{2} \times b \times h$
44. Area (equilateral triangle) = $\frac{\sqrt{3}}{4} \times a^2$
45. Height (equilateral triangle) = $\frac{\sqrt{3}}{2} \times a$
46. Area (parallelogram) = bh
47. Area (rectangle) = lb
48. Area (Rhombus) = $\frac{1}{2} \times d_1 \times d_2$
49. Area (Square) = a^2
50. Area (quadrilateral) = $\frac{1}{2} \times d(h_1 + h_2)$
51. Area (trapezium) = $\frac{1}{2} \times h (a + b)$
52. Perimeter (parallelogram) = $2 (l + b)$
53. Perimeter (rectangle) = $2(l + b)$
54. Perimeter (rhombus) = $4a$
55. Perimeter (square) = $4a$
56. Perimeter (equilateral triangle) = $3a$
57. Diagonal (square) = $\sqrt{2} \times a$
58. Each interior angle (polygon) = $\frac{(2n-4)}{n} 90^\circ$
59. Each exterior angle (polygon) = $360^\circ / n$
60. Sum of all interior angles (polygon) = $(2n-4) 90^\circ$
61. Sum of all exterior angles (polygon) = 360°

62. Number of diagonals (polygon) = $n(n-3) / 2$
63. Area (circle) = πr^2
64. Area (Semi-circle) = $\pi r^2 / 2$
65. Area (quadrant of a circle) = $\pi r^2 / 4$
66. Perimeter (circle) = $2\pi r$
67. Perimeter (semi-circle) = $\pi r + 2r$
68. Perimeter (quadrant of a circle) = $\frac{3\pi r}{2} + 2r$
69. 1km = 1000m.
70. 1m = 100cm.
71. 1cm = 10mm.
72. 1dm = 10cm.
73. 1hectare = 10,000 m².
74. 1m³ = 1000 litres.
75. 1litre = 1000cm³.
76. Standard form of a linear equation in one variable is $ax + b = 0$
77. Standard form of a linear equation in two variables is $ax + by + c = 0$
78. Standard form of a quadratic equation is $ax^2 + bx + c = 0$
79. Standard form of a cubic polynomial is $f(x) = ax^3 + bx^2 + cx + d$
80. Standard form of an even number is $2x$
81. Standard form of an odd number is $2x + 1$
82. Standard form of an integer is x
83. Standard form of a fraction is x/y
84. Standard form of a two digit number is $10x + y$
85. Standard form of two consecutive even numbers are $2x, 2x + 2$
86. Standard form of two consecutive odd numbers are $2x - 1, 2x + 1$
87. Standard form of three consecutive numbers are $x - 1, x, x + 1$
88. Standard form of two consecutive multiples of 3 are $3x, 3x + 3$
89. Formula to find a quadratic polynomial is $f(x) = k[x^2 - (\alpha + \beta)x + \alpha\beta]$
90. Formula to find a cubic polynomial is
$$f(x) = k[x^3 - (\alpha + \beta + \gamma)x^2 + (\alpha\beta + \beta\gamma + \gamma\alpha)x - \alpha\beta\gamma]$$
91. $SI = \frac{PRT}{100}$

92. $CI = \text{Amount} - \text{principle}$

93. $\text{Amount} = P \left(1 + \frac{R}{100} \right)$

94. $\text{Loss} = CP - SP$

95. $\text{Loss \%} = \frac{L}{CP} \times 100$

96. $\text{Profit} = SP - CP$

97. $\text{Loss \%} = \frac{P}{CP} \times 100$

98. $SP \text{ (in case of loss)} = \frac{(100 - \%)}{100} CP$

99. $SP \text{ (in case of profit)} = \frac{(100 + P\%)}{100} CP$

100. $CP \text{ (in case of loss)} = \frac{100 \times SP}{(100 - \%)}$

101. $CP \text{ (in case of Profit)} = \frac{100 \times SP}{100 + P\%}$

102. $\alpha + \beta = -b/a$

103. $\alpha\beta = c/a$

104. $\alpha\beta\gamma = -d/a$

105. $\alpha + \beta + \gamma = -b/a$

106. $\alpha\beta + \beta\gamma + \gamma\alpha = c/a$

107. $\sin 0^\circ = 0$

108. $\cos 0^\circ = 1$

109. $\tan 0^\circ = 0$

110. $\sec 0^\circ = 1$

111. $\cot 0^\circ = \infty$

112. $\sin 30^\circ = 1/2$

113. $\cos 30^\circ = \sqrt{3}/2$

114. $\tan 30^\circ = 1/\sqrt{3}$

115. $\operatorname{cosec} 30^\circ = 2$

116. $\sec 30^\circ = 2/\sqrt{3}$

117. $\cot 30^\circ = \sqrt{3}$

118. $\sin 60^\circ = \sqrt{3}/2$

119. $\cos 60^\circ = 1/2$

120. $\tan 60^\circ = \sqrt{3}$

121. $\operatorname{cosec} 60^\circ = 2/\sqrt{3}$

122. $\sec 60^\circ = 2$

TRIGNOMETRIC IDENTITIES

179. $\sin^2\theta + \cos^2\theta = 1$

180. $\sin^2\theta = 1 - \cos^2\theta$

181. $\sin\theta = \sqrt{1 - \cos^2\theta}$

182. $\cos^2\theta = 1 - \sin^2\theta$

183. $\cos\theta = \sqrt{1 - \sin^2\theta}$

184. $\sec^2\theta - \tan^2\theta = 1$

185. $\sec^2\theta = 1 + \tan^2\theta$

186. $\sec\theta = \sqrt{1 + \tan^2\theta}$

187. $\tan^2\theta = \sec^2\theta - 1$

188. $\tan\theta = \sqrt{\sec^2\theta - 1}$

189. $(\sec\theta + \tan\theta)(\sec\theta - \tan\theta) = 1$

190. $\tan^2\theta - \sec^2\theta = -1$

191. $(\tan\theta + \sec\theta)(\tan\theta - \sec\theta) = -1$

192. $\operatorname{cosec}^2\theta - \cot^2\theta = 1$

193. $\operatorname{cosec}^2\theta = 1 + \cot^2\theta$

194. $\operatorname{cosec}\theta = \sqrt{1 + \cot^2\theta}$

195. $\cot^2\theta = \operatorname{cosec}^2\theta - 1$

196. $\cot\theta = \sqrt{\operatorname{cosec}^2\theta - 1}$

197. $(\operatorname{cosec}\theta + \cot\theta)(\operatorname{cosec}\theta - \cot\theta) = 1$

198. $\cot^2\theta - \operatorname{cosec}^2\theta = -1$

199. $(\cot\theta + \operatorname{cosec}\theta)(\cot\theta - \operatorname{cosec}\theta) = -1$

200. Additive Identity = 0

201. Multiplicative Identity = 1

202. Additive Inverse of $-2/3 = 2/3$

203. Multiplicative Inverse of $-2/3 = -3/2$

204. C = 100

205. L = 50

206. M = 1000

207. D = 500

208. Least composite number = 4

209. Least prime number = 2

210. Least even number = 2

211. Least whole number = 0

212. Least natural number = 1

213. Least odd number = 1

214. Marked price (MP) = $\frac{100 \times SP}{100 - D\%}$

215. Discount % = $\frac{D}{MP} \times 100$

All the best
