

Find the **prime factorization** of the following numbers

1. $384 = 128 \times 3 = 2^7 \times 3$

2. $12500 = 5 \times 25 \times 100$
 $= 5^3 \times (5 \times 2)^2$
 $= 5^5 \times 2^2$

3. $192 = 64 \times 3 = 2^6 \times 3$

4. $686 = 2 \times 343 = 2 \times 7^3$

5. $729 = 9^3 = (3^2)^3 = 3^6$

6. $1575 = 9 \times 175$
 $= 3^2 \times 5 \times 35$
 $= 3^2 \times 5^2 \times 7$

7. $2178 = 198 \times 11$
 $= 18 \times 11 \times 11$
 $= 2 \times 3^2 \times 11^2$

8. $7560 = 1080 \times 7$
 $= 8 \times 135 \times 7$
 $= 8 \times 9 \times 15 \times 7$
 $= 2^3 \times 3^3 \times 5 \times 7$

9. $4913 = 17^3$

1. Factorize the following pairs of integers into primes and hence find the **HCF and LCM**

$24 = 8 \times 3 = 2^3 \times 3$
 $18 = 2 \times 9 = 2 \times 3^2$

Therefore LCM = $2^3 \times 3^2 = 72$
 Therefore HCF = $3 \times 2 = 6$

2. $168 = 2^3 \times 3 \times 7$
 $88 = 2^3 \times 11$

LCM = $2^3 \times 3 \times 7 \times 11 = 1848$
 HCF = $2^3 = 8$

3. $150 = 2 \times 3 \times 5^2$
 $120 = 2^3 \times 3 \times 5$

LCM = $2^3 \times 3 \times 5^2 = 600$
 HCF = $2 \times 3 \times 5 = 30$

4. $196 = 2^2 \times 7^2$
 $56 = 2^3 \times 7$

LCM = $2^3 \times 7^2 = 392$
 HCF = $2^2 \times 7 = 28$

5. $99 = 3^2 \times 11$
 $18 = 2 \times 3^2$

LCM = $2 \times 3^2 \times 11 = 198$
 HCF = $3^2 = 9$

6. $216 = 2^3 \times 3^3$
 $792 = 2^3 \times 3^2 \times 11$

LCM = $216 \times 11 = 2376$
 HCF = $2^3 \times 3^2 = 72$

7. $1320 = 2^3 \times 3 \times 5 \times 11$
 $6050 = 2 \times 5^2 \times 11^2$

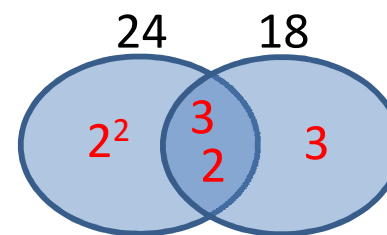
LCM = $2^3 \times 3 \times 5^2 \times 11^2 = 72600$
 HCF = $2 \times 5 \times 11 = 110$

8. $540 = 2^2 \times 3^3 \times 5$
 $462 = 2 \times 3 \times 7 \times 11$

LCM = $2^2 \times 3^3 \times 5 \times 7 \times 11 = 41580$
 HCF = $2 \times 3 = 6$

9. $13104 = 2^4 \times 3^2 \times 7 \times 13$
 $12740 = 2^2 \times 5 \times 7^2 \times 13$

LCM = $2^4 \times 3^2 \times 5 \times 7^2 \times 13 = 458,640$
 HCF = $2^2 \times 7 \times 13 = 364$



Lowest Common Multiple (LCM)
 Highest Common Factor (HCF)

LCM is the **UNION** of sets of prime factors!
 HCF is the **INTERSECTION** of sets of prime factors!

Why LCM, HCF works

$216 = 2^3 \times 3^3$
 $792 = 2^3 \times 3^2 \times 11$

LCM = $216 \times 11 = 2376$
 $2376/216$
 $= 2^3 \times 3^3 \times 11 / (2^3 \times 3^3)$
 $= 11$

$2376/792$
 $= 2^3 \times 3^3 \times 11 / (2^3 \times 3^2 \times 11)$
 $= 3$

HCF = $2^3 \times 3^2 = 72$
 $216/72$
 $= 2^3 \times 3^3 / (2^3 \times 3^2)$
 $= 3$

$792/72$
 $= 2^3 \times 3^2 \times 11 / (2^3 \times 3^2)$
 $= 11$

Prime Factors 2-240

2 = 2 (prime 1)
 3 = 3 (prime 2)
 4 = 2^2
 5 = 5 (prime 3)
 6 = 2×3
 7 = 7 (prime 4)
 8 = 2^3
 9 = 3^2
 10 = 2×5
 11 = 11 (prime 5)
 12 = $2^2 \times 3$
 13 = 13 (prime 6)
 14 = 2×7
 15 = 3×5
 16 = 2^4
 17 = 17 (prime 7)
 18 = 2×3^2
 19 = 19 (prime 8)
 20 = $2^2 \times 5$
 21 = 3×7
 22 = 2×11
 23 = 23 (prime 9)
 24 = $2^3 \times 3$
 25 = 5^2
 26 = 2×13
 27 = 3^3
 28 = $2^2 \times 7$
 29 = 29 (prime 10)
 30 = $2 \times 3 \times 5$
 31 = 31 (prime 11)
 32 = 2^5
 33 = 3×11
 34 = 2×17
 35 = 5×7
 36 = $2^2 \times 3^2$
 37 = 37 (prime 12)
 38 = 2×19
 39 = 3×13
 40 = $2^3 \times 5$

41 = 41 (prime 13)
 42 = $2 \times 3 \times 7$
 43 = 43 (prime 14)
 44 = $2^2 \times 11$
 45 = $3^2 \times 5$
 46 = 2×23
 47 = 47 (prime 15)
 48 = $2^4 \times 3$
 49 = 7^2
 50 = 2×5^2
 51 = 3×17
 52 = $2^2 \times 13$
 53 = 53 (prime 16)
 54 = 2×3^3
 55 = 5×11
 56 = $2^3 \times 7$
 57 = 3×19
 58 = 2×29
 59 = 59 (prime 17)
 60 = $2^2 \times 3 \times 5$
 61 = 61 (prime 18)
 62 = 2×31
 63 = $3^2 \times 7$
 64 = 2^6
 65 = 5×13
 66 = $2 \times 3 \times 11$
 67 = 67 (prime 19)
 68 = $2^2 \times 17$
 69 = 3×23
 70 = $2 \times 5 \times 7$
 71 = 71 (prime 20)
 72 = $2^3 \times 3^2$
 73 = 73 (prime 21)
 74 = 2×37
 75 = 3×5^2
 76 = $2^2 \times 19$
 77 = 7×11
 78 = $2 \times 3 \times 13$
 79 = 79 (prime 22)
 80 = $2^4 \times 5$

81 = 3^4
 82 = 2×41
 83 = 83 (prime 23)
 84 = $2^2 \times 3 \times 7$
 85 = 5×17
 86 = 2×43
 87 = 3×29
 88 = $2^3 \times 11$
 89 = 89 (prime 24)
 90 = $2 \times 3^2 \times 5$
 91 = 7×13
 92 = $2^2 \times 23$
 93 = 3×31
 94 = 2×47
 95 = 5×19
 96 = $2^5 \times 3$
 97 = 97 (prime 25)
 98 = 2×7^2
 99 = $3^2 \times 11$
 100 = $2^2 \times 5^2$
 101 = 101 (prime 26)
 102 = $2 \times 3 \times 17$
 103 = 103 (prime 27)
 104 = $2^3 \times 13$
 105 = $3 \times 5 \times 7$
 106 = 2×53
 107 = 107 (prime 28)
 108 = $2^2 \times 3^3$
 109 = 109 (prime 29)
 110 = $2 \times 5 \times 11$
 111 = 3×37
 112 = $2^4 \times 7$
 113 = 113 (prime 30)
 114 = $2 \times 3 \times 19$
 115 = 5×23
 116 = $2^2 \times 29$
 117 = $3^2 \times 13$
 118 = 2×59
 119 = 7×17
 120 = $2^3 \times 3 \times 5$

121 = 11^2
 122 = 2×61
 123 = 3×41
 124 = $2^2 \times 31$
 125 = 5^3
 126 = $2 \times 3^2 \times 7$
 127 = 127 (prime 31)
 128 = 2^7
 129 = 3×43
 130 = $2 \times 5 \times 13$
 131 = 131 (prime 32)
 132 = $2^2 \times 3 \times 11$
 133 = 7×19
 134 = 2×67
 135 = $3^3 \times 5$
 136 = $2^3 \times 17$
 137 = 137 (prime 33)
 138 = $2 \times 3 \times 23$
 139 = 139 (prime 34)
 140 = $2^2 \times 5 \times 7$
 141 = 3×47
 142 = 2×71
 143 = 11×13
 144 = $2^4 \times 3^2$
 145 = 5×29
 146 = 2×73
 147 = 3×7^2
 148 = $2^2 \times 37$
 149 = 149 (prime 35)
 150 = $2 \times 3 \times 5^2$
 151 = 151 (prime 36)
 152 = $2^3 \times 19$
 153 = $3^2 \times 17$
 154 = $2 \times 7 \times 11$
 155 = 5×31
 156 = $2^2 \times 3 \times 13$
 157 = 157 (prime 37)
 158 = 2×79
 159 = 3×53
 160 = $2^5 \times 5$

161 = 7×23
 162 = 2×3^4
 163 = 163 (prime 38)
 164 = $2^2 \times 41$
 165 = $3 \times 5 \times 11$
 166 = 2×83
 167 = 167 (prime 39)
 168 = $2^3 \times 3 \times 7$
 169 = 13^2
 170 = $2 \times 5 \times 17$
 171 = $3^2 \times 19$
 172 = $2^2 \times 43$
 173 = 173 (prime 40)
 174 = $2 \times 3 \times 29$
 175 = $5^2 \times 7$
 176 = $2^4 \times 11$
 177 = 3×59
 178 = 2×89
 179 = 179 (prime 41)
 180 = $2^2 \times 3^2 \times 5$
 181 = 181 (prime 42)
 182 = $2 \times 7 \times 13$
 183 = 3×61
 184 = $2^3 \times 23$
 185 = 5×37
 186 = $2 \times 3 \times 31$
 187 = 11×17
 188 = $2^2 \times 47$
 189 = $3^3 \times 7$
 190 = $2 \times 5 \times 19$
 191 = 191 (prime 43)
 192 = $2^6 \times 3$
 193 = 193 (prime 44)
 194 = 2×97
 195 = $3 \times 5 \times 13$
 196 = $2^2 \times 7^2$
 197 = 197 (prime 45)
 198 = $2 \times 3^2 \times 11$
 199 = 199 (prime 46)
 200 = $2^3 \times 5^2$

201 = 3×67
 202 = 2×101
 203 = 7×29
 204 = $2^2 \times 3 \times 17$
 205 = 5×41
 206 = 2×103
 207 = $3^2 \times 23$
 208 = $2^4 \times 13$
 209 = 11×19
 210 = $2 \times 3 \times 5 \times 7$
 211 = 211 (prime 47)
 212 = $2^2 \times 53$
 213 = 3×71
 214 = 2×107
 215 = 5×43
 216 = $2^3 \times 3^3$
 217 = 7×31
 218 = 2×109
 219 = 3×73
 220 = $2^2 \times 5 \times 11$
 221 = 13×17
 222 = $2 \times 3 \times 37$
 223 = 223 (prime 48)
 224 = $2^5 \times 7$
 225 = $3^2 \times 5^2$
 226 = 2×113
 227 = 227 (prime 49)
 228 = $2^2 \times 3 \times 19$
 229 = 229 (prime 50)
 230 = $2 \times 5 \times 23$
 231 = $3 \times 7 \times 11$
 232 = $2^3 \times 29$
 233 = 233 (prime 51)
 234 = $2 \times 3^2 \times 13$
 235 = 5×47
 236 = $2^2 \times 59$
 237 = 3×79
 238 = $2 \times 7 \times 17$
 239 = 239 (prime 52)
 240 = $2^4 \times 3 \times 5$