# 3. IDENTIFYING GROUPS

The **order profile** of a finite group (the number of elements of each order) is a useful fingerprint in identifying a group. For abelian groups it identifies the group precisely but for non-abelian groups there are quite a few cases of different groups having the same order profile. For simplicity I condense this information into T, the sum of the orders of the elements. For most groups in this catalogue this is as efficient in distinguishing groups as the order profile itself. And since it is easy to show that T is always odd, it is convenient to consider instead the **weight**, $\Psi = \frac{1}{2}(T - 1)$.

The table lists all non-cyclic groups, G, with orders up to 100 (excluding those of orders 64 and 96) in ascending order of $\Psi$. Where there is more than one group with the same order and $\Psi$ it is necessary to look at the main tables.

| Ψ | G | Ψ | G | Ψ | G | Ψ | G | Ψ | G | Ψ | G | Ψ | G |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **3** | 4.2 | **33** | 16.13 | **48** | 24.08 | **60** | 25.2 | **80** | 24.02 | **99** | 36.03 | **114** | 72.49 |
| **6** | 6.2 | | 18.3 | **49** | 24.14 | | 36.07 | **81** | 40.10 | | 48.22 | **116** | 48.16 |
| **7** | 8.3 | | 24.15 | **50** | 24.12 | **62** | 24.13 | **83** | 32.47 | **100** | 48.17 | | 48.28 |
| **9** | 8.4 | **35** | 20.5 | **51** | 20.4 | **63** | 32.44 | **85** | 50.4 | | 48.27 | | 48.31 |
| **11** | 8.2 | **36** | 24.06 | | 32.14 | | 36.13 | **86** | 24.09 | **101** | 32.49 | **117** | 32.51 |
| **12** | 9.2 | **37** | 16.14 | | 32.38 | | 48.51 | **87** | 32.04 | **102** | 48.44 | | 39.2 |
| **13** | 8.5 | | 18.2 | | 32.39 | **66** | 22.2 | | 32.17 | | 54.08 | | 54.06 |
| **15** | 10.2 | **39** | 18.5 | | 32.43 | | 24.04 | | 32.20 | | 54.10 | **118** | 54.03 |
| | 12.5 | | 32.08 | | 32.46 | | 54.13 | | 36.04 | | 54.11 | | 54.04 |
| | 16.05 | **41** | 20.3 | **52** | 24.03 | **67** | 32.24 | **88** | 30.4 | | 54.19 | **120** | 54.14 |
| **16** | 12.3 | | 27.3 | **55** | 32.05 | | 32.26 | **91** | 26.2 | **103** | 40.12 | | 81.05 |
| **19** | 16.06 | | 27.4 | | 32.09 | | 32.27 | | 32.03 | **104** | 48.15 | | 81.06 |
| **21** | 18.4 | **42** | 21.2 | | 32.12 | **71** | 32.31 | | 32.19 | | 48.25 | **121** | 36.06 |
| **22** | 12.4 | | 24.11 | | 32.16 | | 32.45 | | 32.21 | **105** | 60.13 | **123** | 48.50 |
| **23** | 16.04 | **43** | 16.02 | | 32.18 | **73** | 20.2 | | 32.48 | **107** | 32.32 | | 72.17 |
| | 16.08 | | 16.11 | | 32.37 | | 36.10 | | 42.5 | **108** | 30.3 | **124** | 48.41 |
| | 16.09 | | 24.10 | | 32.41 | **75** | 32.25 | | 48.37 | | 48.05 | **126** | 48.45 |
| **24** | 12.2 | | 32.33 | | 36.09 | | 32.28 | **92** | 28.4 | | 48.40 | **127** | 36.12 |
| **27** | 16.03 | | 32.34 | **56** | 24.07 | | 32.29 | **93** | 27.2 | **109** | 32.50 | | 42.4 |
| | 16.07 | | 32.42 | **57** | 36.24 | | 32.30 | | 27.5 | | 36.11 | | 72.34 |
| | 16.10 | **47** | 32.06 | **59** | 32.15 | | 48.52 | | 40.06 | | 48.49 | **128** | 48.18 |
| **28** | 14.2 | | 32.10 | | 32.23 | **78** | 28.3 | **94** | 24.05 | **111** | 48.34 | | 48.29 |
| **29** | 16.12 | | 32.11 | | 32.35 | **79** | 36.05 | **96** | 48.24 | **112** | 48.26 | **129** | 72.48 |
| **31** | 32.07 | | 32.36 | | 32.40 | | 48.36 | | 48.38 | **113** | 40.08 | **131** | 40.11 |

| Ψ | G | Ψ | G | Ψ | G | Ψ | G | Ψ | G |
|---|---|---|---|---|---|---|---|---|---|
| **132** | 36.08 | **171** | 32.02 | **202** | 72.28 | **261** | 52.3 | **305** | 72.27 |
| **135** | 40.13 | | 32.22 | **206** | 48.12 | **262** | 45.2 | | 80.25 |
| | 75.3 | | 42.6 | | 56.08 | | 48.14 | | 80.38 |
| **136** | 30.2 | | 72.11 | **208** | 78.5 | | 75.2 | **309** | 80.15 |
| | 48.39 | **173** | 72.37 | **209** | 72.38 | **263** | 72.13 | **318** | 48.21 |
| **138** | 48.46 | | 80.22 | | 80.42 | **267** | 72.39 | **321** | 80.18 |
| **139** | 72.31 | | 80.41 | **210** | 44.4 | **269** | 80.34 | | 80.29 |
| **141** | 72.36 | **174** | 81.13 | **213** | 36.02 | **273** | 80.24 | | 80.32 |
| | 72.47 | **175** | 56.13 | | 63.3 | | 80.43 | **323** | 84.11 |
| **142** | 48.42 | | 80.52 | | 72.25 | **276** | 46.2 | **325** | 60.05 |
| **143** | 52.5 | **176** | 48.20 | **216** | 48.19 | | 54.07 | **325** | 80.05 |
| **144** | 72.46 | | 48.32 | | 48.33 | **279** | 42.2 | **335** | 72.41 |
| **145** | 40.07 | **178** | 56.06 | **217** | 72.35 | **280** | 54.02 | | 80.47 |
| **150** | 28.2 | **181** | 50.2 | | 80.27 | | 54.05 | **337** | 72.08 |
| **153** | 34.2 | | 72.43 | | 98.4 | | 60.10 | **339** | 63.4 |
| **154** | 48.47 | **185** | 40.09 | **221** | 68.5 | **281** | 72.20 | **346** | 60.03 |
| **155** | 40.14 | | 100.13 | **223** | 72.33 | | 80.28 | **349** | 84.14 |
| | 48.23 | | 100.14 | **225** | 80.23 | **283** | 40.05 | **352** | 78.4 |
| | 48.35 | **186** | 48.43 | | 84.10 | | 80.45 | **355** | 80.48 |
| **156** | 54.09 | | 60.11 | **228** | 57.2 | **285** | 50.5 | **376** | 72.16 |
| | 54.12 | | 72.30 | | 81.12 | | 72.22 | **385** | 80.36 |
| **157** | 40.03 | | 72.50 | **231** | 100.08 | | 80.40 | **388** | 44.2 |
| | 72.42 | **187** | 72.06 | **233** | 80.37 | **287** | 52.4 | | 72.23 |
| **159** | 72.18 | **188** | 44.3 | **234** | 48.13 | | 72.05 | **401** | 80.20 |
| **160** | 48.06 | **190** | 38.2 | | 84.15 | **289** | 80.33 | **406** | 72.29 |
| | 72.15 | **191** | 72.19 | **237** | 72.07 | | 80.44 | **409** | 80.06 |
| **164** | 48.04 | **192** | 48.03 | | 80.17 | **290** | 60.06 | **421** | 66.4 |
| | 48.08 | | 48.07 | | 80.30 | **297** | 84.08 | **425** | 72.24 |
| | 48.09 | | 48.10 | **241** | 40.02 | **299** | 72.40 | **435** | 58.2 |
| **165** | 50.3 | | 56.10 | | 72.44 | **300** | 54.15 | **443** | 68.3 |
| | 55.2 | **197** | 80.15 | **248** | 60.08 | **301** | 80.16 | **457** | 72.03 |
| **166** | 48.48 | **199** | 40.04 | **249** | 72.21 | | 80.31 | **465** | 66.3 |
| **168** | 49.2 | | 42.3 | **250** | 60.09 | **303** | 80.46 | **467** | 84.09 |
| | 60.12 | | 72.32 | **253** | 80.39 | **304** | 48.02 | **472** | 60.04 |
| | | **201** | 72.45 | **255** | 72.12 | | 48.11 | **473** | 72.14 |

| Ψ | G | Ψ | G | Ψ | G |
|---|---|---|---|---|---|
| **477** | 68.4 | **647** | 84.07 | **1200** | 76.2 |
| **486** | 70.4 | **654** | 88.11 | **1276** | 88.02 |
| **491** | 80.49 | **665** | 100.03 | **1387** | 99.2 |
| **493** | 80.04 | **666** | 70.2 | **1498** | 88.05 |
| | 80.08 | **676** | 88.07 | **1774** | 92.2 |
| | 80.09 | **685** | 90.10 | **1823** | 100.02 |
| | 84.12 | **698** | 88.12 | | |
| **494** | 56.02 | **701** | 72.02 | | |
| **505** | 98.2 | **703** | 74.2 | | |
| **511** | 80.50 | | 80.13 | | |
| **514** | 60.02 | | 90.03 | | |
| **515** | 80.26 | **709** | 84.03 | | |
| **531** | 80.51 | **721** | 66.2 | | |
| **535** | 84.13 | **771** | 80.21 | | |
| **537** | 63.2 | **786** | 88.09 | | |
| | 72.04 | **787** | 80.14 | | |
| **549** | 52.2 | **806** | 92.3 | | |
| | 84.06 | **822** | 81.02 | | |
| **552** | 76.3 | | 81.11 | | |
| **558** | 93.2 | **831** | 100.11 | | |
| **561** | 80.19 | **832** | 88.03 | | |
| **577** | 80.03 | **847** | 90.02 | | |
| | 80.07 | **852** | 92.4 | | |
| | 80.10 | **861** | 82.2 | | |
| **579** | 72.09 | **913** | 80.02 | | |
| **580** | 56.05 | | 80.11 | | |
| **582** | 84.05 | **945** | 90.07 | | |
| **585** | 100.07 | **946** | 86.2 | | |
| **588** | 78.6 | **955** | 68.2 | | |
| **590** | 76.4 | **967** | 84.04 | | |
| **598** | 70.3 | **1020** | 78.2 | | |
| **601** | 100.06 | **1053** | 84.02 | | |
| **607** | 72.10 | **1054** | 88.04 | | |
| **619** | 80.12 | **1099** | 98.5 | | |
| **640** | 78.3 | **1128** | 94.2 | | |