GROUPS OF ORDERS 81-95

SUMMARY

order	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
# abelian	5	1	1	2	1	1	1	3	1	2	1	2	1	1	1
# other decomposable	2	0	0	10	0	0	0	5	0	6	0	1	0	0	0
# other indecomp	8	1	0	3	0	1	0	4	0	2	0	1	1	1	0
TOTAL	**15**	**2**	**1**	**15**	**1**	**2**	**1**	**12**	**1**	**10**	**1**	**4**	**2**	**2**	**1**

81 = $\langle A^{81} \rangle$

81.02 = 27 × 3 = $\langle A^{27}, B^3 \rangle$

81.03 = 9 × 9 = $\langle A^9, B^9 \rangle$

81.04 = 9 × 3^2 = $\langle A^9, B^3, C^3 \rangle$

81.05 = 3^4 = $\langle A^3, B^3, C^3, D^3 \rangle$

81.06 = 27.4 × 3

81.07 = 27.5 × 3

81.08 = $\langle A^3, B^3, C^3, D^3 = B, [C,D] = A \rangle$

CLASS EQUATION: 81 = 1∗9 + 3∗24 **#CC** = 33

ORDER EQUATION: 282∗2 = 3∗26 + 9∗54

NORMAL SUBGROUPS:

H	**1**	**3**	**3**	**3**	3^2	3^2	**9 × 3**	3^3	**G**
G/H	**G**	**9 × 3**	**27.4**	$M_{9,3}^{(4)}$	3^2	**9**	**3**	**3**	**1**
	G″	**G′**		× 2	**Z = 𝔄 = Φ**	× 3	× 3		Z_2

Maximal subgroups: [**9 × 3**] × 3, [3^3]

81.09 = ⟨A³, B³, C³ = A, D³ = B, [C,D] = A⟩

CLASS EQUATION: 81 = 1∗9 + 3∗24 **#CC** = 33

ORDER EQUATION: 336∗2 = 3∗8 + 9∗72

NORMAL SUBGROUPS:

H	**1**	**3**	**3**	**9**	$\mathbf{3^2}$	$\mathbf{9 \times 3}$	**G**
G/H	**G**	$\mathbf{9 \times 3}$	$\mathbf{M_{9,3}^{(4)}}$	**9**	$\mathbf{3^2}$	**3**	**1**

G″ **G′** × 3 × 4 **Z = 𝔄 = Φ** × 4 $\mathbf{Z_2}$

Maximal subgroups: [$\mathbf{9 \times 3}$] × 4

81.10 = ⟨A³, B³ = A, C³, D³, [C,D] = A⟩

CLASS EQUATION: 81 = 1∗9 + 3∗24 **#CC** = 33

ORDER EQUATION: 282∗2 = 3∗26 + 9∗54

NORMAL SUBGROUPS:

H	**1**	**3**	**9**	**9**	$\mathbf{3^2}$	$\mathbf{9 \times 3}$	**27.4**	**G**
G/H	**G**	$\mathbf{3^3}$	$\mathbf{3^2}$	$\mathbf{3^2}$	$\mathbf{3^2}$	**3**	**3**	**1**

G″ **G′ = Φ** **Z = 𝔄** × 8 × 4 × 12 $\mathbf{Z_2}$

Maximal subgroups: [$\mathbf{9 \times 3}$] × 12, [**27.4**]

81.11 = ⟨A³, B³ = A, C³, D³ = B, [C,D] = A⟩ = $\mathbf{M_{27,3}^{(10)}}$

CLASS EQUATION: 81 = 1∗9 + 3∗24 **#CC** = 33

ORDER EQUATION: 822∗2 = 3∗8 + 9∗18 + 27∗54

NORMAL SUBGROUPS:

H	**1**	**3**	**9**	**9**	$\mathbf{3^2}$	**27**	$\mathbf{9 \times 3}$	**G**
G/H	**G**	$\mathbf{9 \times 3}$	$\mathbf{3^2}$	**9**	**9**	**3**	**3**	**1**

G″ **G′** **Z = Φ** × 2 × 3 **𝔄** $\mathbf{Z_2}$

Maximal subgroups: [**27**] × 3, [$\mathbf{9 \times 3}$]

81.12 = ⟨A³, B³, C³, D³, [B,D] = A, [C,D] = B⟩

CLASS EQUATION: 81 = 1∗3 + 3∗8 + 9∗6 **#CC** = 17

ORDER EQUATION: 228∗2 = 3∗44 + 9∗36

NORMAL SUBGROUPS:

H	**1**	**3**	$\mathbf{3^2}$	$\mathbf{M_{9,3}^{(4)}}$	$\mathbf{3^3}$	**27.4**	**G**
G/H	**G**	**27.4**	$\mathbf{3^2}$	**3**	**3**	**3**	**1**

G″ **Z = 𝔄** $\mathbf{Z_2}$ **= G′ = Φ** **× 2** $\mathbf{Z_3}$

Maximal subgroups: [$\mathbf{M_{9,3}^{(4)}}$] × 2, [$\mathbf{3^3}$], [**27.4**]

81.13 = ⟨A^3, B^3, C^3 = A^2, D^3, [B,D] = A, [C,D] = B⟩

CLASS EQUATION: 81 = 1∗9 + 3∗8 + 9∗6 **#CC** = 17

ORDER EQUATION: 174∗2 = 3∗62 + 9∗18

NORMAL SUBGROUPS:

H	**1**	**3**	**3^2**	**9 × 3**	**27.4**	**G**
G/H	**G**	**27.4**	**3^2**	**3**	**3**	**1**

G″ Z = ℜ Z_2 = G′ = Φ × 3 **Z_3**

Maximal subgroups: [**9 × 3**], [**27.4**] × 3

81.14 = ⟨A^3, B^3, C^3 = A, D^3, [B,D] = A, [C,D] = B⟩

CLASS EQUATION: 81 = 1∗9 + 3∗8 + 9∗6 **#CC** = 17

ORDER EQUATION: 282∗2 = 3∗26 + 9∗54

NORMAL SUBGROUPS:

H	**1**	**3**	**3^2**	**9 × 3**	**27.5**	**27.4**	**G**
G/H	**G**	**27.4**	**3^2**	**3**	**3**	**3**	**1**

G″ Z = ℜ Z_2 = G′ = Φ × 2 **Z_3**

Maximal subgroups: [**9 × 3**], [**27.5**] × 2, [**27.4**]

81.15 = ⟨A^3, B^3, C^3 = A^2, D^3 = A, [B,D] = A, [C,D] = B⟩

CLASS EQUATION: 81 = 1∗9 + 3∗8 + 9∗6 **#CC** = 17

ORDER EQUATION: 336∗2 = 3∗8 + 9∗72

NORMAL SUBGROUPS:

H	**1**	**3**	**3^2**	**9 × 3**	**27.5**	**G**
G/H	**G**	**27.4**	**3^2**	**3**	**3**	**1**

G″ Z Z_2 = G′ × 3 **Z_3**

Maximal subgroups: [**9 × 3**], [**27.5**] × 3

82 = ⟨A^82⟩ = 41 × 2

82.2 = D_{82} = ⟨A^41, B^2, BA = A^−1B⟩

CLASS EQUATION: 82 = 1 + 2∗20 + 41 **#CC** = 22

ORDER EQUATION: ∗2 = 2∗41 + 41∗40

NORMAL SUBGROUPS:

H	**1**	**41**	**G**
G/H	**G**	**2**	**1**

G″ = Z G′

Maximal and Sylow subgroups: [**2**] × 41, [**41**]

83 = ⟨A^83⟩

84 = ⟨A^84⟩ = 12 × 7

84.02 = 42 × 2 = $\langle A^{42}, B^2 \rangle$

84.03 = D_6 × 14 = $\langle A^3, B^2, C^{14}, BA = A^{-1}B \rangle$

84.04 = 12.4 × 7

84.05 = A_4 × 7

84.06 = D_{14} × 6 = $\langle A^7, B^2, C^6, BA = A^{-1}B \rangle$

84.07 = 28.4 × 3

84.08 = 21.2 × 2^2

84.09 = 21.2 × 4

84.10 = 42.5 × 2

84.11 = $\langle A^2, B^7, C^3, D^2 = A, [B,C] = B, [B,D] = B^5 \rangle$
CLASS EQUATION: 84 = 1∗2 + 6∗2 + 7∗10 **#CC** = 14
ORDER EQUATION: ∗2 = 2 + 3∗14 + 4∗14 + 6∗14 + 7∗6 + 12∗28 + 14∗6
NORMAL SUBGROUPS:

H	**1**	**2**	**7**	**14**	**21.2**	**28.4**	**42.4**	**G**
G/H	**G**	**42.5**	**12.2**	**6**	**4**	**3**	**2**	**1**

G″ Z = $\mathfrak{A}$ = Φ G′

Maximal subgroups: [**9 × 3**] × 3, [$\mathbf{3^3}$] **Sylow subgroups:** [**3**] × 7, [**4**] × 7, [**7**]

84.12 = D_{42} × 2 = $\langle A^{21}, B^2, C^2, BA = A^{-1}B \rangle$

84.13 = $\langle A^2, B^7, C^3, D^2 = A, [B,D] = B^5, [C,D] = C \rangle$
CLASS EQUATION: 84 = 1∗2 + 2∗20 + 21∗2 **#CC** = 24
ORDER EQUATION: 535∗2 = 2 + 3∗2 + 4∗42 + 6∗2 + 7∗6 + 14∗6 + 21∗12 + 42∗12
NORMAL SUBGROUPS:

H	**1**	**2**	**3**	**6**	**7**	**14**	**21**	**42**	**G**
G/H	**G**	$\mathbf{D_{42}}$	$\mathbf{D_{7,4}}$	$\mathbf{D_{14}}$	$\mathbf{D_{3,4}}$	$\mathbf{D_6}$	**4**	**2**	**1**

G″ Z = $\mathfrak{A}$ G′

Maximal subgroups: [$\mathbf{D_{3,4}}$] × 7, [$\mathbf{D_{7,4}}$] × 3, [**42**] **Sylow subgroups:** [**3**], [**4**] × 21, [**7**]

84.14 = D_{14} × D_6 = $\langle A^7, B^2, C^3, D^2, BA = A^{-1}B, DC = C^{-1}D \rangle$

84.15 = $\langle A^2, B^2, C^7, D^3, [A,D] = BA, [B,D] = A, [C,D] = C\rangle$
CLASS EQUATION: 84 = 1 + 3∗9 + 28∗3 **#CC** = 12
ORDER EQUATION: 234∗2 = 2∗3 + 3∗56 + 7∗6 + 14∗18
NORMAL SUBGROUPS:

H	**1**	**7**	$\mathbf{2^2}$	$\mathbf{14 \times 2}$	**G**
G/H	**G**	$\mathbf{A_4}$	$\mathbf{M_{7,3}^{(2)}}$	**3**	**1**

Z = G″ = $\mathfrak{N}$ = Φ **G′**

Maximal subgroups: [A_4] × 7, [$M_{7,3}^{(2)}$] × 4, [**14 × 2**] **Sylow subgroups:** [**3**] × 28, [$\mathbf{2^2}$], [**7**]

85 = $\langle A^{85}\rangle$ = 17 × 5

86 = $\langle A^{86}\rangle$ = 43 × 2

86.2 = D_{86} = $\langle A^{43}, B^2, BA = A^{-1}B\rangle$
CLASS EQUATION: 86 = 1∗2 + 2∗20 + 21∗2 **#CC** = 23
ORDER EQUATION: ∗2 = 2∗43 + 43∗42
NORMAL SUBGROUPS:

H	**1**	**43**	**G**
G/H	**G**	**2**	**1**

Z = G″ **G′**

Maximal and Sylow subgroups: [**2**] × 43, [**43**]

87 = $\langle A^{87}\rangle$ = 29 × 3

88 = $\langle A^{88}\rangle$ = 11 × 8

88.02 = 44 × 2 = $\langle A^{44}, B^2\rangle$

88.03 = 22 × 2^2 = $\langle A^{22}, B^2, C^2\rangle$

88.04 = D_8 × 11 = $\langle A^4, B^2, C^{11}, BA = A^{-1}B\rangle$

88.05 = Q_8 × 11 = $\langle A^4, B^2 = A^2, C^{11}, BA = A^{-1}B\rangle$

88.06 = D_{22} × 2^2 = $\langle A^{11}, B^2, C^2, D^2, BA = A^{-1}B\rangle$

88.07 = D_{22} × 4 = $\langle A^{11}, B^2, C^4, BA = A^{-1}B\rangle$

88.08 = D_{44} × 2 = $\langle A^{22}, B^2, C^2, BA = A^{-1}B\rangle$

88.09 = $\langle A^2, B^2 = A, C^{11}, D^2 = B, [C,D] = C^9 \rangle$

CLASS EQUATION: 88 = 1∗4 + 2∗20 + 11∗4 **#CC** = 28

ORDER EQUATION: 786∗2 = 2 + 4∗2 + 8∗44 + 11∗10 + 22∗10 + 44∗20

NORMAL SUBGROUPS:

H	1	2	4	11	22	44	G
G/H	G	$D_{11,4}$	D_{22}	8	4	2	1

G″ Z = 𝔄 = Φ G′

Maximal subgroups: [**8**] × 11, [**44**] **Sylow subgroups:** [**8**] × 11, [**11**]

88.10 = $\langle A^2, B^{11}, C^2, D^2, [B,D] = B^9, [C,D] = A \rangle$

CLASS EQUATION: 88 = 1∗2 + 2∗21 + 22∗2 **#CC** = 25

ORDER EQUATION: 454∗2 = 2∗25 + 4∗22 + 11∗10 + 22∗30

NORMAL SUBGROUPS:

H	1	2	2^2	11	22	22 × 2	$D_{22} \times 2$	$D_{11,4}$	G
G/H	G	$D_{22} \times 2$	D_{22}	D_6	2^2	2	2	2	1

G″ Z = 𝔄 = Φ G′

Maximal subgroups: [D_8] × 11, [**22 × 2**] **Sylow subgroups:** [D_8] × 11, [**11**]

88.11 = $\langle A^2, B^{11}, C^2 = A, D^2, [B,D] = B^9, [C,D] = A \rangle$

CLASS EQUATION: 88 = 1∗2 + 2∗21 + 22∗2 **#CC** = 25

ORDER EQUATION: 654∗2 = 2∗45 + 4∗2 + 11∗10 + 22∗10 + 44∗20

NORMAL SUBGROUPS:

H	1	2	11	4	22	44	$D_{22} \times 2$	G
G/H	G	$D_{22} \times 2$	D_8	D_{22}	2^2	2	2	1

G″ = 𝔄 = Φ Z Z_2 G′ × 2

Maximal subgroups: [D_8] × 11, [**44**], [$D_{22} \times 2$] × 2 **Sylow subgroups:** [D_8] × 11, [**11**]

88.12 = $\langle A^2, B^{11}, C^2 = A, D^2 = A, [B,D] = B^9, [C,D] = A \rangle$

CLASS EQUATION: 88 = 1∗2 + 2∗21 + 22∗2 **#CC** = 25

ORDER EQUATION: 698∗2 = 2 + 4∗46 + 11∗10 + 22∗10 + 44∗20

NORMAL SUBGROUPS:

H	1	2	11	4	22	44	$D_{11,4}$	G
G/H	G	$D_{22} \times 2$	Q_8	D_{22}	2^2	2	2	1

Z = Φ Z_2 = 𝔄 G′ × 2

Maximal subgroups: [Q_8] × 11, [**44**], [$D_{11,4}$] × 2 **Sylow subgroups:** [Q_8] × 11, [**11**]

89 = $\langle A^{89} \rangle$

90 = $\langle A^{90} \rangle$ = 10 × 9

90.02 = 30 × 3 = $\langle A^{30}, B^3 \rangle$

90.03 = $D_6 \times 15 = \langle A^3, B^2, C^{15}, BA = A^{-1}B \rangle$

90.04 = 18.4 × 5

90.05 = $D_{18} \times 5 = \langle A^9, B^2, C^5, BA = A^{-1}B \rangle$

90.06 = $D_{10} \times 3^2 = \langle A^5, B^2, C^3, D^3, BA = A^{-1}B \rangle$

90.07 = $D_{10} \times 9 = \langle A^5, B^2, C^9, BA = A^{-1}B \rangle$

90.08 = $D_{30} \times 3 = \langle A^{15}, B^2, C^3, BA = A^{-1}B \rangle$

90.09 = $\langle A^5, B^3, C^3, D^2, [A,D] = A^3, [B,D] = B, [C,D] = C \rangle$
CLASS EQUATION: 90 = 1 + 2∗22 + 45 **#CC** = 24
ORDER EQUATION: 307∗2 = 2∗45 + 3∗8 + 5∗4 + 15∗32
NORMAL SUBGROUPS:

H	**1**	**3**	**5**	3^2	**15**	**15 × 3**	**G**
G/H	**G**	D_{30}	**18.4**	D_{10}	D_6	**2**	**1**

Z = G″ = $\mathfrak{N}$ = Φ × 4 × 4 **G′**

Maximal subgroups: [**15 × 3**], [D_{30}] × 12, [**18.4**] × 5 **Sylow subgroups:** [**2**] × 45, [3^2], [**5**]

90.10 = $\langle A^5, B^3, C^3 = B, D^2, [A,D] = A^3, [B,D] = B, [C,D] = CB^2 \rangle$
CLASS EQUATION: 90 = 1 + 2∗22 + 45 **#CC** = 24
ORDER EQUATION: 685∗2 = 2∗45 + 3∗2 + 5∗4 + 9∗6 + 15∗8 + 45∗24
NORMAL SUBGROUPS:

H	**1**	**3**	**5**	**9**	**15**	**45**	**G**
G/H	**G**	D_{30}	D_{18}	D_{10}	D_6	**2**	**1**

Z = G″ = $\mathfrak{N}$ Φ G′

Maximal subgroups: [**45**], [D_{30}] × 3, [D_{18}] × 5 **Sylow subgroups:** [**2**] × 45, [**5**], [**9**]

91 = $\langle A^{91} \rangle$ = 13 × 7

92 = $\langle A^{92} \rangle$ = 23 × 4

92.2 = 23 × 4 = $\langle A^{23}, B^4 \rangle$

92.3 = $D_{46} \times 2 = \langle A^{23}, B^2, C^2, BA = A^{-1}B \rangle$

92.4 = $D_{23,4}$ = ⟨A^{23}, B^4, BA = $A^{-1}B$⟩ = Q_{92}

CLASS EQUATION: 92 = 1∗2 + 2∗22 + 23∗2 **#CC** = 26

ORDER EQUATION: 812∗2 = 2 + 4∗26 + 23∗22 + 46∗22

NORMAL SUBGROUPS:

H	1	2	23	46	G
G/H	G	D_{46}	4	2	1

Z = ℜ = Φ G′

93 = ⟨A^{93}⟩ = 31 × 3

93.2 =

94 = ⟨A^{94}⟩ = 47 × 2

94.2 = D_{94} = ⟨A^{47}, B^2, BA = $A^{-1}B$⟩

CLASS EQUATION: 94 = 1 + 2∗23 + 47 **#CC** = 25

ORDER EQUATION: 1128∗2 = 2∗47 + 47∗46

NORMAL SUBGROUPS:

H	1	47	G
G/H	G	2	1

Z = ℜ = Φ G′

Maximal and Sylow subgroups: [**2**] × 47, [**47**]

95 = ⟨A^{95}⟩ = 19 × 5