

# GROUPS OF ORDER 80

## SUMMARY

order	<b>80</b>
# abelian	5
# other decomposable	24
# other indecomposable	23
<b>TOTAL</b>	<b>52</b>

$$80 = \langle A^{80} \rangle = 16 \times 5$$

$$80.02 = 40 \times 2 = \langle A^{40}, B^2 \rangle$$

$$80.03 = 20 \times 4 = \langle A^{20}, B^4 \rangle$$

$$80.04 = 20 \times 2^2 = \langle A^{20}, B^2, C^2 \rangle$$

$$80.05 = 10 \times 2^3 = \langle A^{10}, B^2, C^2, D^2 \rangle$$

$$80.06 = D_8 \times 10 = \langle A^4, B^2, C^{10}, BA = A^{-1}B \rangle$$

$$80.07 = Q_8 \times 10 = \langle A^4, B^2 = A^2, C^{10}, BA = A^{-1}B \rangle$$

$$80.08 = 16.08 \times 5$$

$$80.09 = 16.09 \times 5$$

$$80.10 = 16.10 \times 5$$

$$80.11 = 16.11 \times 5$$

$$80.12 = 16.12 \times 5$$

$$80.13 = 16.13 \times 5$$

$$80.14 = 16.14 \times 5$$

$$80.15 = D_{10} \times 2^3 = \langle A^5, B^2, C^2, D^2, E^2, BA = A^{-1}B \rangle$$

$$80.16 = D_{10} \times 4 \times 2 = \langle A^5, B^2, C^4, D^2, BA = A^{-1}B \rangle$$

$$80.17 = 20.4 \times 2^2$$

$$80.19 = D_{10} \times 8 = \langle A^5, B^2, C^8, BA = A^{-1}B \rangle$$

$$80.20 = 40.9 \times 2$$

$$80.21 = \langle A^2, B^2 = A, C^2 = B, D^5, E^2 = C, [D,E] = D^3 \rangle$$

**CLASS EQUATION:**  $80 = 1*8 + 2*16 + 5*8 \quad \#CC = 32$

**ORDER EQUATION:**  $771*2 = 2 + 4*2 + 5*4 + 8*4 + 10*4 + 16*40 + 20*8 + 40*16$

**NORMAL SUBGROUPS:**

H	1	2	4	5	8	10	20	40	G
G/H	G	D <sub>5,8</sub>	D <sub>5,4</sub>	16	D <sub>10</sub>	8	4	2	1

$$G' \quad Z = \mathcal{N} = \Phi$$

**Sylow subgroups:** [5], [16] × 5

**Maximal subgroups:** [40], [16] × 5

$$80.22 = 20.5 \times 2^2$$

$$80.23 = 20.5 \times 4$$

$$80.24 = 40.11 \times 2$$

$$80.25 = \langle A^2, B^2 = A, C^5, D^2 = A, E^2 = D, [C,D] = C^3, [C,E] = C \rangle$$

**CLASS EQUATION:**  $80 = 1*4 + 4*4 + 5*12 \quad \#CC = 20$

**ORDER EQUATION:**  $305*2 = 2*11 + 4*12 + 5*4 + 8*40 + 10*4 + 20*8$

**NORMAL SUBGROUPS:**

H	1	2	4	5	10	D <sub>10</sub>	20	D <sub>10</sub> × 2	D <sub>10</sub> × 4	M <sub>5,8</sub> <sup>(3)</sup>	G
G/H	G	M <sub>5,4</sub> <sup>(3)</sup> × 2	M <sub>5,4</sub> <sup>(2)</sup>	8 × 2	4 × 2	8	4	4	2	2	1

$$\Phi \quad Z = \mathcal{N} \quad G' \quad \times 2 \quad \times 2 \quad \times 2$$

**Sylow subgroups:** [5], [8 × 2] × 5

**Maximal subgroups:** [8 × 2] × 5, [D<sub>10</sub> × 4], [M<sub>5,8</sub><sup>(3)</sup>] × 2

$$80.26 = \langle A^2, B^2 = A, C^5, D^2 = B, E^2 = D, [C,D] = C^3, [C,E] = C \rangle$$

$$\text{CLASS EQUATION: } 80 = 1*4 + 4*4 + 5*12 \quad \#CC = 20$$

$$\text{ORDER EQUATION: } 515*2 = 2 + 4*2 + 5*4 + 8*20 + 10*4 + 16*40 + 20*8$$

**NORMAL SUBGROUPS:**

H	1	2	4	5	20	D <sub>5,8</sub>	G
G/H	G	M <sub>5,8</sub> <sup>(3)</sup>	M <sub>5,4</sub> <sup>(2)</sup>	16	4	2	1

$$Z = \mathcal{Z} = \Phi \quad G'$$

**Sylow subgroups:** [5], [16] × 5

**Maximal subgroups:** [D<sub>5,8</sub>], [16] × 5

$$80.27 = 40.12 \times 2$$

$$80.28 = 40.13 \times 2$$

$$80.29 = 40.14 \times 2$$

$$80.30 = \langle A^2, B^2, C^5, D^2, E^2 = B, [C,E] = C^3, [D,E] = A \rangle$$

$$\text{CLASS EQUATION: } 80 = 1*4 + 2*18 + 10*4 \quad \#CC = 26$$

$$\text{ORDER EQUATION: } 237*2 = 2*7 + 4*40 + 5*4 + 10*28$$

**NORMAL SUBGROUPS:**

H	1	2	2	2 <sup>2</sup>	2 <sup>2</sup>	5	2 <sup>3</sup>
G/H	G	D <sub>5,4</sub> × 2	20 × 2	D <sub>10</sub> × 2	D <sub>5,4</sub>	16.09	D <sub>10</sub>

$$\times 2 \quad Z = \mathcal{Z} = \Phi \quad \times 2 \quad Z_2$$

H	10	10	10 × 2	10 × 2	10 × 2 <sup>2</sup>	D <sub>5,4</sub> × 2	G
G/H	4 × 2	D <sub>8</sub>	4	2 <sup>2</sup>	2	2	1

$$G' \quad \times 2 \quad \times 2 \quad \times 2$$

**Sylow subgroups:** [5], [16.09] × 5

**Maximal subgroups:** [16.09] × 5, [10 × 2<sup>2</sup>], [D<sub>5,4</sub> × 2] × 2

$$80.31 = \langle A^2, B^2, C^5, D^2 = B, E^2, [C,E] = C^3, [D,E] = A \rangle$$

$$\text{CLASS EQUATION: } 80 = 1*4 + 2*18 + 10*4 \quad \#CC = 26$$

$$\text{ORDER EQUATION: } 301*2 = 2*23 + 4*24 + 5*4 + 10*12 + 20*16$$

**NORMAL SUBGROUPS:**

H	1	2	2	2 <sup>2</sup>	5	4 × 2
G/H	G	D <sub>10</sub> × 4	D <sub>40</sub>	D <sub>10</sub> × 2	16.9	D <sub>10</sub>

× 2    Z = ℳ = Φ                      Z<sub>2</sub>

H	10	10	10 × 2	D <sub>10</sub> × 2	20 × 2	D <sub>10</sub> × 2 <sup>2</sup>	D <sub>5,4</sub> × 2	G
G/H	4 × 2	4 × 2	2 <sup>2</sup>	4	2	2	2	1

G'                      × 2

**Sylow subgroups:** [5], [16.09] × 5

**Maximal subgroups:** [16.09] × 5, [20 × 2], [D<sub>10</sub> × 2<sup>2</sup>], [D<sub>5,4</sub> × 2]

$$80.32 = \langle A^2, B^2, C^5, D^2 = B, E^2 = A, [C,E] = C^3, [D,E] = A \rangle$$

$$\text{CLASS EQUATION: } 80 = 1*4 + 2*18 + 10*4 \quad \#CC = 26$$

$$\text{ORDER EQUATION: } 321*2 = 2*3 + 4*44 + 5*4 + 10*12 + 20*16$$

**NORMAL SUBGROUPS:**

H	1	2	2	2	2 <sup>2</sup>	5	4 × 2
G/H	G	D <sub>10</sub> × 4	40.12	Q <sub>40</sub>	D <sub>10</sub> × 2	D <sub>4,4</sub>	D <sub>10</sub>

Z = ℳ = Φ                      Z<sub>2</sub>

H	10	10	10	10 × 2	D <sub>5,4</sub>	20 × 2	D <sub>5,4</sub> × 2	G
G/H	4 × 2	D <sub>8</sub>	Q <sub>8</sub>	2 <sup>2</sup>	4	2	2	1

G'    × 2    × 2

**Sylow subgroups:** [5], [D<sub>4,4</sub>] × 5

**Maximal subgroups:** [D<sub>4,4</sub>] × 5, [20 × 2], [D<sub>5,4</sub> × 2] × 2

$$80.33 = \langle A^2, B^2, C^5, D^2 = A, E^2 = B, [C,E] = C^3, [D,E] = A \rangle$$

$$\text{CLASS EQUATION: } 80 = 1*4 + 2*18 + 10*4 \quad \#CC = 26$$

$$\text{ORDER EQUATION: } 321*2 = 2*3 + 4*44 + 5*4 + 10*12 + 20*16$$

**NORMAL SUBGROUPS:**

H	1	2	2	2	4	2 <sup>2</sup>	5	4 × 2
G/H	G	D <sub>5,4</sub> × 2	D <sub>40</sub>	Q <sub>40</sub>	D <sub>5,4</sub>	D <sub>10</sub> × 2	D <sub>4,4</sub>	D <sub>10</sub>

× 2

H	10	10	10	10 × 2	20	20 × 2	D <sub>5,4</sub> × 2	G
G/H	4 ×	D <sub>6</sub>	Q <sub>8</sub>	4	4	2	2	1

× 2    × 2

**Sylow subgroups:** [5], [D<sub>4,4</sub>] × 5

**Maximal subgroups:** [D<sub>4,4</sub>] × 5, [20 × 2], [D<sub>5,4</sub> × 2] × 2

$$80.34 = \langle A^2, B^2 = A, C^5, D^2, E^2, [C,E] = C^3, [D,E] = A \rangle$$

$$\text{CLASS EQUATION: } 80 = 1*4 + 2*18 + 10*4 \quad \#CC = 26$$

$$\text{ORDER EQUATION: } 301*2 = 2*23 + 4*24 + 5*4 + 10*12 + 20*16$$

**NORMAL SUBGROUPS:**

H	1	2	4	4	2 <sup>2</sup>	5	4 × 2	10
G/H	G	D <sub>10</sub> × 2 <sup>2</sup>	D <sub>10</sub> × 2	D <sub>10</sub> × 2	D <sub>10</sub> × 2	16.8	D <sub>10</sub>	2 <sup>3</sup>
		Φ	Z = ℳ				Z <sub>2</sub>	G'

H	20	20	D <sub>10</sub> × 2	D <sub>5,4</sub>	20 × 2	D <sub>10</sub> × 4	40.12	D <sub>40</sub>	Q <sub>40</sub>	G
G/H	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2	2	2	2	2	1
		× 2	× 2	× 2		× 2	× 2			

**Sylow subgroups:** [5], [16.8] × 5

**Maximal subgroups:** [16.8] × 5, [20 × 2], [D<sub>10</sub> × 4] × 2, [40.12] × 2, [D<sub>40</sub>], [Q<sub>40</sub>]

$$80.35 = \langle A^2, B^2 = A, C^5, D^2, E^2 = B, [C,E] = C^3, [D,E] = A \rangle$$

$$\text{CLASS EQUATION: } 80 = 1*4 + 2*18 + 10*4 \quad \#CC = 26$$

$$\text{ORDER EQUATION: } 243*2 = 2*3 + 4*5 + 5*4 + 10*12 + 20*16$$

**NORMAL SUBGROUPS:**

H	1	2	4	4	2 <sup>2</sup>	5	4 × 2
G/H	G	D <sub>5,4</sub> × 2	D <sub>10</sub> × 2	D <sub>5,4</sub>	D <sub>5,4</sub>	M <sub>6,2</sub> <sup>(5)</sup>	D <sub>10</sub>
			Z = Φ				Z <sub>2</sub> = ℳ

H	10	10 × 2	20	20	20 × 2	D <sub>5,8</sub>	G
G/H	4 × 2	4	4	2 <sup>2</sup>	2	2	1
			G'			× 2	

**Sylow subgroups:** [5], [M<sub>8,2</sub><sup>(5)</sup>] × 5

**Maximal subgroups:** [M<sub>8,2</sub><sup>(5)</sup>] × 5, [20 × 2], [D<sub>5,8</sub>] × 2

$$80.36 = \langle A^2, B^2 = A, C^5, D^2 = B, E^2, [C,E] = C^3, [D,E] = A \rangle$$

$$\text{CLASS EQUATION: } 80 = 1*4 + 2*18 + 10*4 \quad \#CC = 26$$

$$\text{ORDER EQUATION: } 561*2 = 2*11 + 4*12 + 5*4 + 8*24 + 10*4 + 20*8 + 40*16$$

**NORMAL SUBGROUPS:**

H	1	2	4	5	8	10
G/H	G	D <sub>10</sub> × 4	D <sub>10</sub> × 2	M <sub>8,2</sub> <sup>(5)</sup>	D <sub>10</sub>	4 × 2
			Z = ℳ = Φ		Z <sub>2</sub>	G'

H	20	D <sub>10</sub> × 2	D <sub>5,4</sub>	40	D <sub>10</sub> × 4	D <sub>5,8</sub>	G
G/H	2 <sup>2</sup>	4	4	2	2	2	1

**Sylow subgroups:** [5], [16.11] × 5

**Maximal subgroups:** [16.11] × 5, [40.3], [40.7], [40.9]

$$80.37 = D_{10} \times D_8 = \langle A^5, B^2, C^4, D^2, BA = A^{-1}B, DC = C^{-1}D \rangle$$

$$80.38 = D_{10} \times Q_8 = \langle A^5, B^2, C^4, D^4 = C^2, BA = A^{-1}B, DC = C^{-1}D \rangle$$

$$80.39 = \langle A^2, B^5, C^2 = A, D^2, E^2 = A, [B,E] = B^3, [C,D] = A \rangle$$

$$\text{CLASS EQUATION: } 80 = 1*2 + 2*7 + 4*6 + 10*3 + 5*2 \quad \#CC = 20$$

$$\text{ORDER EQUATION: } 269*2 = 2*15 + 4*32 + 5*4 + 10*20 + 20*8$$

**NORMAL SUBGROUPS:**

H	1	2	4	2 <sup>2</sup>	5	D <sub>8</sub>	10
G/H	G	D <sub>10</sub> × 2 <sup>2</sup>	D <sub>10</sub> × 2	D <sub>10</sub> × 2	16.08	D <sub>10</sub>	2 <sup>3</sup>
		Z = ℳ = Φ		× 2		Z <sub>2</sub>	G'

H	10 × 2	20	D <sub>10</sub> × 2	D <sub>5,4</sub>	D <sub>8</sub> × 5	D <sub>10</sub> × 4	D <sub>5,4</sub> × 2	40.12	Q <sub>40</sub>	G
G/H	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2	2	2	2	2	1
	× 2			× 3			× 2	× 2		

**Sylow subgroups:** [5], [16.08] × 5

**Maximal subgroups:** [16.08] × 5, [D<sub>10</sub> × 4], [D<sub>5,4</sub> × 2] × 2, [40.12] × 2, [Q<sub>40</sub>]

$$80.40 = \langle A^2, B^5, C^2 = A, D^2 = A, E^2 = A, [B,E] = B^3, [C,D] = A \rangle$$

$$\text{CLASS EQUATION: } 80 = 1*2 + 2*7 + 4*6 + 10*3 + 5*2 \quad \#CC = 20$$

$$\text{ORDER EQUATION: } 333*2 = 2*31 + 4*16 + 5*4 + 10*4 + 20*24$$

**NORMAL SUBGROUPS:**

H	1	2	4	5	Q <sub>8</sub>	10
G/H	G	D <sub>10</sub> × 2 <sup>2</sup>	D <sub>10</sub> × 2	16.08	D <sub>10</sub>	2 <sup>3</sup>
		Z = ℳ = Φ	× 3		Z <sub>2</sub>	G'

H	20	D <sub>10</sub> × 2	D <sub>5,4</sub>	Q <sub>6</sub> × 5	D <sub>10</sub> × 4	D <sub>40</sub>	G
G/H	2 <sup>2</sup>	2 <sup>2</sup>	2 <sup>2</sup>	2	2	2	1
	× 3	× 3			× 3	× 3	

**Sylow subgroups:** [5], [16.08] × 5

**Maximal subgroups:** [16.8] × 5, [Q<sub>8</sub> × 5], [D<sub>10</sub> × 4] × 3, [D<sub>40</sub>] × 3

$$80.41 = \langle A^2, B^5, C^2, D^2, E^2 = C, [B,C] = B^3, [B,E] = B, [D,E] = A \rangle$$

$$\text{CLASS EQUATION: } 80 = 1*2 + 2 + 4*4 + 5*2 + 10*5 \quad \#CC = 14$$

$$\text{ORDER EQUATION: } 173*2 = 2*23 + 4*40 + 5*4 + 10*12$$

**NORMAL SUBGROUPS:**

H	1	2	2 <sup>2</sup>	5	10
G/H	G	M <sub>5,4</sub> <sup>(3)</sup> × 2	M <sub>5,4</sub> <sup>(2)</sup>	16.9	4 × 2
		Z = ℳ = Φ	Z <sub>2</sub>		G'

H	D <sub>10</sub>	10 × 2	D <sub>10</sub> × 2	D <sub>10</sub> × 2	D <sub>10</sub> × 2 <sup>2</sup>	M <sub>5,4</sub> <sup>(3)</sup> × 2	G
G/H	D <sub>8</sub>	4	4	2 <sup>2</sup>	2	2	1
		× 2				× 2	

**Sylow subgroups:** [5], [16.09] × 5

**Maximal subgroups:** [16.09] × 5, [D<sub>10</sub> × 2<sup>2</sup>], [M<sub>5,4</sub><sup>(3)</sup> × 2] × 2

$$80.42 = \langle A^2, B^5, C^2, D^2 = A, E^2 = C, [B,C] = B^3, [B,E] = B, [D,E] = A \rangle$$

$$\text{CLASS EQUATION: } 80 = 1*2 + 2 + 4*4 + 5*2 + 10*5 \quad \#CC = 14$$

$$\text{ORDER EQUATION: } 215*2 = 2 + 4*52 + 5*4 + 10*4 + 20*8$$

**NORMAL SUBGROUPS:**

H	1	2	4	5	10
G/H	G	M <sub>5,4</sub> <sup>(3)</sup> × 2	M <sub>5,4</sub> <sup>(2)</sup>	D <sub>4,4</sub>	4 × 2
		Z = ℳ = Φ	Z <sub>2</sub>		G'

H	D <sub>10</sub>	D <sub>10</sub>	20	D <sub>10</sub> × 2	D <sub>5,4</sub>	D <sub>10</sub> × 4	M <sub>5,4</sub> <sup>(3)</sup> × 2	G
G/H	D <sub>8</sub>	Q <sub>8</sub>	4	2 <sup>2</sup>	4	2	2	1
							× 2	

**Sylow subgroups:** [5], [D<sub>4,4</sub>] × 5

**Maximal subgroups:** [D<sub>4,4</sub>] × 5, [D<sub>10</sub> × 4], [M<sub>5,4</sub><sup>(3)</sup> × 2] × 2

$$80.43 = \langle A^2, B^5, C^2 = A, D^2, E^2 = C, [B,C] = B^3, [B,E] = B, [D,E] = A \rangle$$

$$\text{CLASS EQUATION: } 80 = 1*2 + 2 + 4*4 + 5*2 + 10*5 \quad \#CC = 14$$

$$\text{ORDER EQUATION: } 273*2 = 2*3 + 4*20 + 5*4 + 8*40 + 10*12$$

**NORMAL SUBGROUPS:**

H	1	2	2	2 <sup>2</sup>	5	10
G/H	G	M <sub>5,4</sub> <sup>(3)</sup> × 2	M <sub>5,4</sub> <sup>(3)</sup> × 2	M <sub>5,4</sub> <sup>(2)</sup>	M <sub>8,2</sub> <sup>(5)</sup>	4 × 2
		Z = Φ	× 2	Z <sub>2</sub> = ℳ		G'

H	10 × 2	D <sub>5,4</sub>	D <sub>5,4</sub>	10 × 2 <sup>2</sup>	D <sub>5,4</sub> × 2	G
G/H	4	4	2 <sup>2</sup>	2	2	1
				× 2		

**Sylow subgroups:** [5], [M<sub>8,2</sub><sup>(5)</sup>] × 5

**Maximal subgroups:** [M<sub>8,2</sub><sup>(5)</sup>] × 5, [10 × 2<sup>2</sup>] × 2, [D<sub>5,4</sub> × 2]

$$80.44 = \langle A^2, B^5, C^2 = A, D^2 = A, E^2 = C, [B,C] = B^3, [B,E] = B, [D,E] = A \rangle$$

$$\text{CLASS EQUATION: } 80 = 1*2 + 2 + 4*4 + 5*2 + 10*5 \quad \#CC = 14$$

$$\text{ORDER EQUATION: } 305*2 = 2*11 + 4*12 + 5*4 + 8*40 + 10*4 + 20*8$$

**NORMAL SUBGROUPS:**

H	1	2	4	5	10	20	$D_{10} \times 2$	$D_{5,4}$	$D_{10} \times 4$	$M_{5,8}^{(3)}$	G
G/H	G	$M_{5,4}^{(3)} \times 2$	$M_{5,4}^{(2)}$	$M_{8,2}^{(5)}$	$4 \times 2$	4	4	$2^2$	2	2	1

$Z = \Phi \quad Z_2 = \mathcal{N} \quad G' \quad \times 2$

**Sylow subgroups:** [5],  $[M_{8,2}^{(5)}] \times 5$

**Maximal subgroups:**  $[M_{8,2}^{(5)}] \times 5$ ,  $[D_{10} \times 4]$ ,  $[M_{5,8}^{(3)}] \times 2$

$$80.45 = \langle A^2, B^2 = A, C^5, D^2 = B, E^2, [B,E] = A, [C,D] = C^3, [D,E] = B \rangle$$

$$\text{CLASS EQUATION: } 80 = 1*2 + 2*5 + 4*7 + 10*2 + 20 \quad \#CC = 17$$

$$\text{ORDER EQUATION: } 214*2 = 2*25 + 4*2 + 5*4 + 8*20 + 10*20 + 20*8$$

**NORMAL SUBGROUPS:**

H	1	2	4	5	$D_8$	10	20	$D_8 \times 5$	$D_{5,8}$	$D_{40}$	G
G/H	G	40.12	$D_{10} \times 2$	$D_{16}$	$D_{10}$	$D_8$	$2^2$	2	2	2	1

$Z = \mathcal{N} \quad Z_2 = \Phi \quad Z_3 \quad G'$

**Sylow subgroups:** [5],  $[D_{16}] \times 5$

**Maximal subgroups:**  $[D_{16}] \times 5$ ,  $[D_8 \times 5]$ ,  $[D_{5,8}]$ ,  $[D_{40}]$

$$80.46 = \langle A^2, B^2 = A, C^5, D^2 = BA, E^2, [B,E] = A, [C,D] = C^3, [D,E] = B \rangle$$

$$\text{CLASS EQUATION: } 80 = 1*2 + 2*5 + 4*7 + 10*2 + 20 \quad \#CC = 17$$

$$\text{ORDER EQUATION: } 319*2 = 2*5 + 4*22 + 5*4 + 8*20 + 10*20 + 20*8$$

**NORMAL SUBGROUPS:**

H	1	2	4	5	$D_6$	10	20	$D_8 \times 5$	$D_{5,8}$	$Q_{40}$	G
G/H	G	40.12	$D_{10} \times 2$	$M_{8,2}^{(3)}$	$D_{10}$	$D_8$	$2^2$	2	2	2	1

$Z = \mathcal{N} \quad Z_2 = \Phi \quad Z_3 = G'$

**Sylow subgroups:** [5],  $[M_{8,2}^{(3)}] \times 5$

**Maximal subgroups:**  $[M_{8,2}^{(3)}] \times 5$ ,  $[D_8 \times 5]$ ,  $[D_{5,8}]$ ,  $[Q_{40}]$

$$80.47 = \langle A^2, B^2 = A, C^5, D^2 = B, E^2 = A, [B,E] = A, [C,D] = C^3, [D,E] = B \rangle$$

$$\text{CLASS EQUATION: } 80 = 1*2 + 2*5 + 4*7 + 10*2 + 20 \quad \#CC = 17$$

$$\text{ORDER EQUATION: } 383*2 = 2*21 + 4*6 + 5*4 + 8*20 + 10*4 + 20*24$$

**NORMAL SUBGROUPS:**

H	1	2	4	5	$Q_8$	10	20	$Q_8 \times 5$	$D_{5,4} \times 2$	$D_{40}$	G
G/H	G	40.12	$D_{10} \times 2$		$D_{10}$	$D_8$	$2^2$	2	2	2	1

$Z = \mathcal{N} \quad Z_2 = \Phi \quad M_{8,2}^{(3)} \quad Z_3 \quad G'$

**Sylow subgroups:** [5],  $[M_{8,2}^{(3)}] \times 5$

**Maximal subgroups:**  $[M_{8,2}^{(3)}] \times 5$ ,  $[Q_8 \times 5]$ ,  $[D_{5,4} \times 2]$ ,  $[D_{40}]$

$$80.48 = \langle A^2, B^2 = A, C^5, D^2 = BA, E^2 = A, [B,E] = A, [C,D] = C^3, [D,E] = B \rangle$$

$$\text{CLASS EQUATION: } 80 = 1*2 + 2*5 + 4*7 + 10*2 + 20 \quad \#CC = 17$$

$$\text{ORDER EQUATION: } 403*2 = 2 + 4*26 + 5*4 + 8*20 + 10*4 + 20*24$$

**NORMAL SUBGROUPS:**

H	1	2	4	5	Q <sub>8</sub>	10	20	Q <sub>8</sub> × 5	D <sub>5,8</sub>	Q <sub>40</sub>	G
G/H	G	40.12	D <sub>10</sub> × 2	Q <sub>16</sub>	D <sub>10</sub>	D <sub>8</sub>	2 <sup>2</sup>	2	2	2	1
	Z	Z <sub>2</sub> = ℳ = Φ		Z <sub>3</sub>		G'					

**Sylow subgroups:** [5], [Q<sub>16</sub>] × 5

**Maximal subgroups:** [Q<sub>16</sub>] × 5, [Q<sub>8</sub> × 5] × 2, [D<sub>5,8</sub>], [Q<sub>40</sub>]

$$80.49 = \langle A^2, B^2 = A, C^5, D^2 = BA, E^2, [B,E] = A, [C,E] = C^3, [D,E] = B \rangle = D_{80}$$

$$\text{CLASS EQUATION: } 80 = 1*2 + 2*19 + 20*2 \quad \#CC = 23$$

$$\text{ORDER EQUATION: } 491*2 = 2*41 + 4*2 + 5*4 + 8*4 + 10*4 + 20*8 + 40*16$$

**NORMAL SUBGROUPS:**

H	1	2	4	5	8	10	20	40	D <sub>40</sub>	G
G/H	G	D <sub>40</sub>	D <sub>10</sub> × 2	D <sub>16</sub>	D <sub>10</sub>	D <sub>8</sub>	2 <sup>2</sup>	2	2	1
	Z = ℳ	Z <sub>2</sub> = Φ		Z <sub>3</sub>		G'			× 2	

**Sylow subgroups:** [5], [D<sub>16</sub>] × 5

**Maximal subgroups:** [1D<sub>16</sub>] × 5, [40], [D<sub>40</sub>] × 2

$$80.50 = \langle A^2, B^2 = A, C^5, D^2 = B, E^2, [B,E] = A, [C,E] = C^3, [D,E] = B \rangle = M_{40,2}^{(19)}$$

$$\text{CLASS EQUATION: } 80 = 1*2 + 2*19 + 20*2 \quad \#CC = 23$$

$$\text{ORDER EQUATION: } 511*2 = 2*21 + 4*22 + 5*4 + 8*4 + 10*4 + 20*8 + 40*16$$

**NORMAL SUBGROUPS:**

H	1	2	4	5	8	10	20	40	D <sub>40</sub>	Q <sub>40</sub>	G
G/H	G	40.13	20.3	M <sub>8,2</sub> <sup>(3)</sup>	D <sub>10</sub>	D <sub>8</sub>	2 <sup>2</sup>	2	2	2	1
	Z = ℳ	Z <sub>2</sub> = Φ		Z <sub>3</sub>		G'					

**Sylow subgroups:** [5], [M<sub>8,2</sub><sup>(3)</sup>] × 5

**Maximal subgroups:** [M<sub>8,2</sub><sup>(3)</sup>] × 5, [40], [D<sub>40</sub>], [Q<sub>40</sub>]

$$80.51 = \langle A^2, B^2 = A, C^5, D^2 = BA, E^2 = A, [B,E] = A, [C,E] = C^3, [D,E] = B \rangle$$

$$\text{CLASS EQUATION: } 80 = 1*2 + 2*19 + 20*2 \quad \#CC = 23$$

$$\text{ORDER EQUATION: } 531*2 = 2 + 4*42 + 5*4 + 8*4 + 10*4 + 20*8 + 40*16$$

**NORMAL SUBGROUPS:**

H	1	2	4	5	8	10	20	40	Q <sub>40</sub>	G
G/H	G	D <sub>40</sub>	D <sub>10</sub> × 2	Q <sub>16</sub>	D <sub>10</sub>	D <sub>8</sub>	2 <sup>2</sup>	2	2	1
	Z	Z <sub>2</sub> = ℳ = Φ		Z <sub>3</sub>		G'			× 2	

**Sylow subgroups:** [5], [Q<sub>16</sub>] × 5

**Maximal subgroups:** [Q<sub>16</sub>] × 5, [40], [Q<sub>40</sub>] × 2

$80.52 = \langle A^2, B^2, C^2, D^2, E^5, [A,E] = BA, [B,E] = CB, [C,E] = DC, [D,E] = CBA \rangle$

**CLASS EQUATION:**  $80 = 1 + 5 \cdot 3 + 16 \cdot 4$  #CC = 8

**ORDER EQUATION:**  $175 \cdot 2 = 2 \cdot 15 + 5 \cdot 64$

**NORMAL SUBGROUPS:**

<b>H</b>	<b>1</b>	<b><math>2^4</math></b>	<b>G</b>
<b>G/H</b>	<b>G</b>	<b>5</b>	<b>1</b>

$$Z = \mathcal{Z} = \Phi \quad G'$$

**Maximal and Sylow subgroups:**  $[5] \times 16, [2^4]$