

$$d = 4$$

$$\Psi_{\mathbb{Q}}(4) \supseteq \{(3), (4), (5), (6), (8), (10), (12), (13), (15), (16), (20), (24), (2, 4), (2, 6), (2, 8), (2, 10), (2, 12), (2, 16), (3, 3), (3, 6), (4, 4), (4, 8), (5, 5), (6, 6)\}$$

$G$	$\Psi_{\mathbb{Q}}(4, G) \setminus \{G\} \supseteq$
( )	$\{(3), (5), (13), (15), (3, 3), (5, 5)\}$
(2)	$\{(4), (6), (8), (10), (12), (16), (20), (24), (2, 4), (2, 6), (2, 8), (2, 10), (2, 12), (2, 16), (3, 6), (4, 4), (4, 8), (6, 6)\}$
(3)	$\{(15)\}$
(4)	$\{(8), (16), (24), (2, 8), (2, 12), (2, 16), (4, 4), (4, 8)\}$
(5)	$\{(5, 5)\}$
(6)	$\{(12), (24), (2, 12), (6, 6)\}$
(7)	$\{\}$
(8)	$\{(16), (2, 16), (4, 8)\}$
(9)	$\{\}$
(10)	$\{(20)\}$
(12)	$\{(24)\}$
(2, 2)	$\{(2, 4), (2, 8), (2, 12), (2, 16), (4, 4), (4, 8)\}$
(2, 4)	$\{(2, 8), (2, 16), (4, 4), (4, 8)\}$
(2, 6)	$\{(2, 12)\}$
(2, 8)	$\{(2, 16), (4, 8)\}$

$$g_{\mathbb{Q}}(4) \geq 5 \quad \#\mathcal{G}_{\mathbb{Q}}(4) \geq 104 \quad M_{\mathbb{Q}}(4) \geq 18176$$

$G$	$\mathcal{H}_{\mathbb{Q}}(4, E)$	Label
()	(3, 3)	175b2
()	(5)	11a2
()	(5, 5)	275b2
()	(13)	2890d1
()	(15)	50a4
()	$(3)^2$	121b1
()	$(5)^2$	18176b2
()	$(3)^2, (5)$	338d1
(2)	(2, 4)	120b1
(2)	(2, 8)	45a1
(2)	(2, 12)	30a3
(2)	(2, 16)	3150bk1
(2)	(4)	36a3
(2)	(4, 4)	320a4
(2)	(4, 8)	2880r6
(2)	$(2, 4)^2$	33a4
(2)	(2, 4), (2, 8)	144b1
(2)	(2, 4), (2, 12)	720j3
(2)	$(2, 12)^2$	960o7
(2)	(4), (2, 4)	49a1
(2)	(4), (2, 6)	14a3
(2)	(4), (2, 10)	150b3
(2)	(4), (2, 12)	1040g2
(2)	(4), (6, 6)	98a3
(2)	(4), (10)	66c3
(2)	(8), (2, 4)	33a2
(2)	(8), (2, 12)	960e3
(2)	(8), (4, 4)	64a4
(2)	(12), (2, 6)	36a4
(2)	(16), (2, 8)	63a1
(2)	(20), (2, 10)	450a4
(2)	(24), (2, 12)	960o3
(2)	(4), (2, 4), (2, 6)	130a4
(2)	(4), (6), (2, 6)	726a1
(2)	$(4), (6)^2$	726a2
(2)	$(6)^2, (2, 4)$	256a1
(2)	$(8), (2, 4)^2$	17a3

$G$	$\mathcal{H}_{\mathbb{Q}}(4, E)$	Label
(2)	(8), (2, 4), (2, 8)	24a6
(2)	(8) <sup>2</sup> , (2, 4)	45a3
(2)	(8) <sup>2</sup> , (2, 8)	45a6
(2)	(16) <sup>2</sup> , (2, 8)	75b1
(2)	(4), (2, 6) <sup>2</sup> , (3, 6)	112c3
(2)	(8) <sup>2</sup> , (2, 4) <sup>2</sup>	63a6
(2)	(8) <sup>2</sup> , (16), (2, 8)	75b6
(2)	(8), (16), (2, 4), (2, 8)	510e7
(2)	(12), (2, 6) <sup>2</sup> , (3, 6)	98a4
(2)	(12) <sup>2</sup> , (2, 4), (2, 6)	30a7
(2)	(16) <sup>2</sup> , (2, 4), (2, 8)	1470k3
(2)	(8) <sup>3</sup> , (2, 4) <sup>2</sup>	15a5
(2)	(8) <sup>4</sup> , (2, 4)	630c6
(2)	(8) <sup>4</sup> , (4, 4)	4410r6
(2)	(8), (12) <sup>2</sup> , (2, 4), (2, 6)	90c5
(2)	(8), (16) <sup>2</sup> , (2, 4), (2, 8)	1680p1
(2)	(12) <sup>2</sup> , (2, 4) <sup>2</sup> , (2, 6)	90c4
(3)	(15)	50a1
(4)	(2, 8)	24a3
(4)	(4, 8)	240d6
(4)	(8)	33a3
(4)	(8), (2, 8)	17a4
(4)	(8), (2, 12)	90c1
(4)	(8), (2, 16)	1470k1
(4)	(8), (4, 4)	17a1
(4)	(16), (2, 8)	21a4
(4)	(24), (2, 12)	960o8
(4)	(2, 8) <sup>2</sup> , (4, 4)	195a6
(4)	(16) <sup>2</sup> , (2, 8)	15a7
(4)	(16) <sup>3</sup> , (2, 8)	1230f4
(4)	(16) <sup>2</sup> , (2, 8) <sup>2</sup> , (4, 4)	210e6
(5)	(5, 5)	11a1
(6)	(2, 12)	30a1
(6)	(12)	14a4
(6)	(2, 12) <sup>2</sup>	90c7
(6)	(12), (2, 12)	130a2
(6)	(12), (6, 6)	14a1

$G$	$\mathcal{H}_{\mathbb{Q}}(4, E)$	Label
(6)	(24), (2, 12)	90c8
(8)	(2, 16)	210e1
(8)	(16)	21a3
(8)	(16), (2, 16)	1230f1
(8)	(16), (4, 8)	15a4
(10)	(20)	66c1
(12)	(24)	90c3
(2, 2)	(4, 4)	17a2
(2, 2)	(4, 8)	75b3
(2, 2)	$(2, 4)^2$	33a1
(2, 2)	$(2, 8), (4, 4)$	21a2
(2, 2)	$(2, 4)^3$	120b2
(2, 2)	$(2, 4)^2, (2, 8)$	45a5
(2, 2)	$(2, 4)^2, (2, 12)$	30a6
(2, 2)	$(2, 4)^2, (2, 16)$	75b2
(2, 2)	$(2, 4), (2, 12)^2$	720j6
(2, 2)	$(2, 8)^2, (4, 4)$	42a3
(2, 2)	$(2, 12)^3$	150c6
(2, 2)	$(2, 4)^2, (2, 8)^2$	45a2
(2, 2)	$(2, 8)^3, (4, 4)$	15a2
(2, 2)	$(2, 8)^4, (4, 4)$	210e5
(2, 4)	(4, 8)	15a1
(2, 4)	$(2, 8)^2$	195a3
(2, 4)	$(2, 8), (4, 4)$	21a1
(2, 4)	$(2, 8)^2, (4, 4)$	24a1
(2, 4)	$(2, 8)^2, (4, 8)$	240d4
(2, 4)	$(2, 8), (2, 16), (4, 4)$	15a3
(2, 6)	$(2, 12)^2$	90c6
(2, 6)	$(2, 12)^3$	30a2
(2, 8)	$(2, 16)^2, (4, 8)$	210e2