

LE ESPRESSIONI CON I NUMERI INTERI (\mathbb{Z})

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Sommario *Il presente documento contiene un certo numero di esercizi svolti a supporto del lettore. Risolverli, costituisce un metodo efficace per imparare ed acquisire le tecniche matematiche necessarie per affrontare lo studio di argomenti successivi.*

INDICE

Introduzione	3
1 Le espressioni con i numeri interi (\mathbb{Z})	4
2 Storia delle revisioni	24

INTRODUZIONE

Gli esercizi proposti nel codesto documento riguardano il seguente argomento:

- *le espressioni con i numeri interi (\mathbb{Z}).*

Le tracce di alcuni esercizi trovano ispirazione dai seguenti libri:

- *Matematica.verde 1, Bergamini, Trifone, Barozzi - Zanichelli Editore;*
- *Corso di algebra 1, Dodero, Toscani - Ghisetti e Corvi Editori.*

LE ESPRESSIONI CON I NUMERI INTERI (\mathbb{Z})

$$\begin{aligned}10 + 2 + 3 - 4 \cdot 2^2 - 4^2 : 4 - 45 : 9 - 6 &= \\= 15 - 4 \cdot 4 - 4 - 5 - 6 &= \\= 15 - 16 - 9 - 6 &= \\= -1 - 15 &= -16.\end{aligned}\tag{1}$$

$$\begin{aligned}(2 \cdot 5) - (15 : 5 - 3^2 : 3) + 4 \cdot (2^2 - 3^2) + (15 - 1) &= \\= 10 - (3 - 3) + 4 \cdot (4 - 9) + 14 &= \\= 10 - 0 + 4 \cdot (-5) + 14 &= \\= 10 - 20 + 14 &= -10 + 14 = +4.\end{aligned}\tag{2}$$

$$\begin{aligned}(10 \cdot 2 - (4 + 2)) : (3^2 - 2) + 7 \cdot (2^3 - 5) - 6 : 3 + (2^2)^3 - (5 \cdot 10) &= \\= (20 - 6) : (9 - 2) + 7 \cdot (8 - 5) - 6 : 3 + (4)^3 - 50 &= \\= 14 : 7 + 7 \cdot 3 - 2 + 64 - 50 &= \\= 2 + 21 - 2 + 64 - 50 &= \\= 23 + 62 - 50 &= 85 - 50 = +35.\end{aligned}\tag{3}$$

$$\begin{aligned}((7 + 3) + 6 \cdot 2^2) : (2^3 : 2^2) - 60 : 2 + (7 - 6 \cdot 4) - (4 + 3 - 7^2) &= \\= (10 + 6 \cdot 4) : (2^1) - 30 + (7 - 24) - (4 + 3 - 49) &= \\= (10 + 24) : 2 - 30 - 17 - (7 - 49) &= \\= 34 : 2 - 30 - 17 + 42 &= \\= 17 - 30 - 17 + 42 &= \\= -13 - 17 + 42 &= \\= -30 + 42 &= +12.\end{aligned}\tag{4}$$

$$\begin{aligned}[17 - (15 \cdot 2 - 13)]^3 + [(7)^2 : 7]^0 - [15 + 6 \cdot (12 - 24 : 2)] + 7 &= \\= [17 - (30 - 13)]^3 + [+49 : 7]^0 - [15 + 6 \cdot (12 - 12)] + 7 &= \\= [17 - 17]^3 + 7^0 - [15 + 6 \cdot 0] + 7 &= \\= 0^3 + 1 - [15 + 0] + 7 &= \\= 0 + 1 - 15 + 7 &= \\= +1 - 15 + 7 &= -14 + 7 = -7.\end{aligned}\tag{5}$$

$$\begin{aligned}
(26-11)-(-2)^3 \cdot (2^2)+17 \cdot 2-6 \cdot 10-\left[(4)^2\right]^3:(2)^4+(400:2) &= \\
= 15-(-2)^3 \cdot (2)^2+34-60-[4]^6:16+200 &= \\
= 15-(-2)^5+34-60-[4]^6:[4]^2+200 &= \\
= 15-(-32)+34-60-4^4+200 &= \\
= 15+32+34-60-256+200 &= \quad (6) \\
= 47+34-60-256+200 &= \\
= 81-60-256+200 &= \\
= 21-256+200 &= \\
= -235+200 = -35. &
\end{aligned}$$

$$\begin{aligned}
\{[2-7 \cdot (6-8)]:(-2)-(-2^3+4)\}:(-2)+[-(-2+7) \cdot (-4)] &= \\
= \{[2-7 \cdot -2]:(-2)-(-8+4)\}:(-2)+[-(+5) \cdot (-4)] &= \\
= \{[2+14]:(-2)-(-4)\}:(-2)+[-5 \cdot (-4)] &= \\
= \{16:(-2)-(-4)\}:(-2)+20 &= \quad (7) \\
= \{-8-(-4)\}:(-2)+20 &= \\
= \{-8+4\}:(-2)+20 &= \\
= -4:(-2)+20 &= \\
= +2+20 = +22. &
\end{aligned}$$

$$\begin{aligned}
[(7-23):(-2)^3+(18-20) \cdot (-7+4)] \cdot (8-11)+(-2 \cdot 3+4 \cdot 3^2) &= \\
= [-16:-8+(-2) \cdot (-3)] \cdot (-3)+(-6+36) &= \\
= [+2+(+6)] \cdot (-3)+(+30) &= \quad (8) \\
= [+2+6] \cdot (-3)+30 &= \\
= +8 \cdot (-3)+30 &= \\
= -24+30 = +6. &
\end{aligned}$$

$$\begin{aligned}
(-5+3)^3 \cdot 2^2-\{[(5-7) \cdot (4-1)+3]:3-(-5)+2 \cdot (-4)\}+(2^0-1) &= \\
= (-2)^3 \cdot 4-\{[-2 \cdot 3+3]:3+5-8\}+0 &= \\
= -8 \cdot 4-\{[-6+3]:3-3\} &= \\
= -32-\{-3:3-3\} &= \\
= -32-\{-1-3\} &= \\
= -32-\{-4\} &= \\
= -32+4 = -28. & \quad (9)
\end{aligned}$$

$$\begin{aligned}
& \{-(+7) - [-3 \cdot (-3)]\} + \{[6 \cdot (4^0)] - [-(-2)]\} - \{ -[-(-5)] - \\
& \qquad \qquad \qquad + [(-1) \cdot (-3)]\} = \\
& = \{-7 - [+9]\} + \{[+6] - [+2]\} - \{-[+5] - [+3]\} = \\
& = \{-7 - 9\} + \{+6 - 2\} - \{-5 - 3\} = \\
& = \{-16\} + \{+4\} - \{-8\} = \\
& = -16 + 4 + 8 = -12 + 8 = -4.
\end{aligned} \tag{10}$$

$$\begin{aligned}
& (45 : 3 - 40 : 2) - \{20 : 2 - [3 \cdot (-2)] - (-15) : 3\} + \\
& \qquad \qquad \qquad + [(12) : (3) - (-6) \cdot (-2)] : [(-5) \cdot 4 + 17^1] = \\
& = (15 - 20) - \{10 - [-6 - (-5)] + [+4 - (+12)]\} : [-20 + 17] = \\
& = -5 - \{10 - [-6 + 5] + [+4 - 12]\} : -3 = \\
& = -5 - \{10 - [-1] + [-8]\} : -3 = \\
& = -5 - \{10 + 1 - 8\} : -3 = \\
& = -5 - \{11 - 8\} : -3 = \\
& = -5 - \{3\} : -3 = \\
& = -5 - 3 : -3 = \\
& = -5 + 1 = -4.
\end{aligned} \tag{11}$$

$$\begin{aligned}
& \left\{ [(4)^3 \cdot (4)^4 \cdot (-4)^2] : [(-4)^3 \cdot (-4)^1] \right\} : [-(4)^3 \cdot (-6)^0] = \\
& = \left\{ [(+4^7) \cdot (-4)^2] : [(+4^4)] \right\} : [-(4^3) \cdot 1] = \\
& = \{ [(-4^9)] : (+4^4) \} : -(4^3) = \\
& = \{ (-4^9) : (+4^4) \} : -(4^3) = \\
& = \{-4^5\} : -(4^3) = \\
& = -1024 : -64 = +16.
\end{aligned} \tag{12}$$

$$\begin{aligned}
& \left\{ [(3)^4 \cdot (7)^4]^2 : [(21)^1 \cdot (21)^4] \right\} : \left\{ [(-7)^2]^2 : 7 \right\} = \\
& = \left\{ [(21)^4]^2 : (21)^5 \right\} : \{ (7)^4 : 7 \} = \\
& = \left\{ (21)^8 : (21)^5 \right\} : \{ 7^4 : 7 \} = \\
& = \{ 21^3 \} : \{ 7^3 \} = \\
& = 3^3 \cdot 7^3 : 7^3 = \\
& = 3^3 \cdot 1 = +27.
\end{aligned} \tag{13}$$

$$\begin{aligned}
& [(3+60):(47-80:2)]:[(64:2)+29]\cdot\{-5\cdot(4)- \\
& \quad +[-5+(-4\cdot 7+4):2]+1\}= \\
= & [63:(47-40)]:[-32+29]\cdot\{-20-[-5+(-28+4):2]+1\}= \\
& = [63:7]:-3\cdot\{-20-[-5-24:2]+1\}= \\
& = 9:-3\cdot\{-20-[-5-12]+1\}= \quad (14) \\
& = -3\cdot\{-20-[-17]+1\}= \\
& = -3\cdot\{-20+17+1\}= \\
& = -3\cdot\{-3+1\}= \\
& = -3\cdot-2=+6.
\end{aligned}$$

$$\begin{aligned}
& \{4^2:[18-5\cdot(10-9+1)]\}^3:(2)^2+6\cdot[4-(3\cdot 2+1)]-(5\cdot 3)= \\
& = \{16:[18-5\cdot(1+1)]\}^3:+4+6\cdot[4-(6+1)]-15= \\
& = \{16:[18-5\cdot(2)]\}^3:+4+6\cdot[4-(7)]-15= \\
& = \{16:[18-10]\}^3:+4+6\cdot[4-7]-15= \quad (15) \\
& = \{16:8\}^3:+4+6\cdot-3-15= \\
& = \{2\}^3:+4-18-15= \\
& = 8:+4-18-15= \\
& = 2-18-15=-16-15=-31.
\end{aligned}$$

$$\begin{aligned}
& \{(-2)^4 - [(-2)^2 + 3^5 : (3)^3 \cdot (2^3 : 2^2)^2] : [(-2^2)^1 \cdot (13^0)]\} \cdot 2 - = \\
& \hspace{10em} + (-4)^2 = \\
& = \{16 - [4 + 3^4 : 9 \cdot (2^1)^2] : [(-4)^1 \cdot 1]\} \cdot 2 - (+16) = \\
& = \{16 - [4 + 3^4 : 3^2 \cdot (2^2)] : [(-4) \cdot 1]\} \cdot 2 - 16 = \\
& = \{16 - [4 + 3^2 \cdot 4] : [(-4) \cdot 1]\} \cdot 2 - 16 = \\
& = \{16 - [4 + 9 \cdot 4] : [-4]\} \cdot 2 - 16 = \\
& = \{16 - [4 + 36] : -4\} \cdot 2 - 16 = \\
& = \{16 - [40] : -4\} \cdot 2 - 16 = \\
& = \{16 - 40 : -4\} \cdot 2 - 16 = \\
& = \{16 + 10\} \cdot 2 - 16 = \\
& = \{26\} \cdot 2 - 16 = \\
& = 52 - 16 = 36.
\end{aligned} \tag{16}$$

$$\begin{aligned}
& [(2 \cdot 9 - 10 \cdot 2) \cdot (-2)^2]^3 : [(-2)^2]^3 - [-7 \cdot (6 - 8)]^2 : [(2)^5 - (-5)^2]^2 = \\
& = [(18 - 20) \cdot 4]^3 : (-2)^6 - [-7 \cdot -2]^2 : [(2)^5 - (+25)]^2 = \\
& = [-2 \cdot 4]^3 : +64 - [14]^2 : [32 - 25]^2 = \\
& = [-8]^3 : +8^2 - [14]^2 : [7]^2 = \\
& = -8^3 - 196 : 49 = -8 - 4 = -12.
\end{aligned} \tag{17}$$

$$\begin{aligned}
& \left\{ \left[(6 \cdot 4 - 7 \cdot 3)^4 : (3)^2 \right]^3 : (3)^6 \right\} \cdot [15 - (18 + 4)]^2 - 40 - 3 + 7 = \\
& = \left\{ \left[(24 - 21)^4 : 9 \right]^3 : (3)^6 \right\} \cdot [15 - (22)]^2 - 43 + 7 = \\
& = \left\{ \left[(3)^4 : 9 \right]^3 : (3)^6 \right\} \cdot [15 - 22]^2 - 43 + 7 = \\
& = \left\{ \left[((3)^2)^2 : 9 \right]^3 : (3)^6 \right\} \cdot [15 - 22]^2 - 43 + 7 = \\
& = \left\{ \left[9^2 : 9 \right]^3 : ((3)^2)^3 \right\} \cdot [-7]^2 - 43 + 7 = \\
& = \left\{ \left[9^1 \right]^3 : 9^3 \right\} \cdot [-7]^2 - 43 + 7 = \\
& = \left\{ 9^3 : 9^3 \right\} \cdot 49 - 43 + 7 = \\
& = \{1\} \cdot 49 - 43 + 7 = \\
& = 49 - 43 + 7 = 6 + 7 = 13.
\end{aligned} \tag{18}$$

$$\begin{aligned}
& \left[(-3)^9 : (+3)^6 \cdot (+3)^2 \right] \cdot (-2)^5 : \left[-(+7)^2 \cdot (-7)^3 : (-7^2)^2 - 1 \right]^{5-1} - \\
& \quad + 6^4 : \left[(+2)^3 \cdot (-3)^3 \right] = \\
& = \left[(-3)^3 \cdot (+3)^2 \right] \cdot (-2)^5 : \left[-(-7)^5 : (+7^2)^2 - 1 \right]^4 - 6^4 : [(-6)^3] = \\
& = \left[(-3)^5 \right] \cdot (-2)^5 : \left[+7^5 : +7^4 - 1 \right]^4 - 6^4 : (-6)^3 = \\
& = (-3)^5 \cdot (-2)^5 : \left[+7^1 - 1 \right]^4 + 6^1 = \\
& = (+6)^5 : \left[7 - 1 \right]^4 + 6 = \\
& = 6^5 : \left[6 \right]^4 + 6 = \\
& = 6^5 : 6^4 + 6 = \\
& = 6^1 + 6 = \\
& = 6 + 6 = 12.
\end{aligned} \tag{19}$$

$$\begin{aligned}
& \left\{ \left[(-3)^6 \cdot (-3)^2 \right] : (-3)^5 \right\}^2 : \left[(-3) \cdot (-3)^2 \right]^2 - 3^0 + (6 - 5) + \\
& \quad + \left[(+2)^3 \cdot (2)^4 \right] : \left[(-2)^3 \right]^2 = \\
& = \left\{ \left[+3^8 \right] : (-3)^5 \right\}^2 : \left[+3^3 \right]^2 - 1 + 1 + \left[2^7 \right] : \left[(-2)^6 \right] = \\
& = \left\{ -3^3 \right\}^2 : +3^6 + 0 + 2^7 : 2^6 = \\
& = +3^6 : +3^6 + 2^1 = \\
& = +3^0 + 2 = \\
& = 1 + 2 = 3.
\end{aligned} \tag{20}$$

$$\begin{aligned}
& \left\{ \left[-2^2 \cdot (+2)^5 \right] \cdot \left[(+3)^2 \cdot (-3)^5 \right] \right\} : (+6)^5 - 3^2 + (-3)^2 : (+3) - 2^0 = \\
& = \left\{ -2^7 \cdot (-3)^7 \right\} : 6^5 - 3^2 + 3^2 : 3 - 1 = \\
& = 6^7 : 6^5 - 3^2 + 3^1 - 1 = \\
& = 6^2 - 9 + 3 - 1 = \\
& = 36 - 9 + 3 - 1 = 27 + 2 = 29.
\end{aligned} \tag{21}$$

$$\begin{aligned}
& (+4^2)^3 \cdot \left\{ [(-2)^3]^2 \cdot [(+2)^2]^4 \right\} : \left\{ [(-4)^3]^2 \right\}^2 + (-4)^2 \cdot (+4)^3 : (-4)^4 + (9-1) - 2^3 = \\
& = 4^6 \cdot \left\{ (-2)^6 \cdot (2)^8 \right\} : (-4)^{12} + (-4)^5 : (-4)^4 + 8 - 8 = \\
& = 4^6 \cdot \left\{ 2^6 \cdot 2^8 \right\} : (-4)^{12} + (+4)^1 + 0 = \\
& = 4^6 \cdot 2^{14} : (-4)^{12} + 4 = \\
& = (2^2)^6 \cdot 2^{14} : +4^{12} + 4 = \\
& = 2^{12} \cdot 2^{14} : + (2^2)^{12} + 4 = \\
& = 2^{12} \cdot 2^{14} : 2^{24} + 4 = \\
& = 2^{26} : 2^{24} + 4 = \\
& = 2^2 + 4 = 4 + 4 = 8.
\end{aligned} \tag{22}$$

$$\begin{aligned}
& \left\{ (28)^6 : (2)^6 : [(+14)^1]^6 \cdot (-14) \right\}^7 : \left\{ [(-21)^2]^3 : (+3)^6 \right\} : (-2)^4 = \\
& = \left\{ (+14)^6 : [+14]^6 \cdot (-14) \right\}^7 : \left\{ [-21]^6 : (+3)^6 \right\} : (+2)^4 = \\
& = \left\{ (+14)^0 \cdot (-14) \right\}^7 : \left\{ [+21]^6 : (+3)^6 \right\} : (+2)^4 = \\
& = \left\{ (-14)^1 \right\}^7 : \left\{ [7]^6 \right\} : (+2)^4 = \\
& = \left\{ -14 \right\}^7 : \left\{ [7]^6 \right\} : (+2)^4 = \\
& = -14^7 : 7^6 : 2^4 = -56.
\end{aligned} \tag{23}$$

$$\begin{aligned}
& 4 - (2^3 + (2^0 \cdot 4)) : 4 + \left\{ 2^3 \cdot [-5^2 : (-5)]^3 \right\} : [(-6)^3 : (-2)^3 + \\
& \quad -3^2 - 2^3] - 5^0 = \\
& = 4 - (8 + 4) : 4 + \left\{ 8 \cdot [-25 : -5]^3 \right\} : [3^3 - 9 - 8] - 1 = \\
& = 4 - 12 : 4 + \left\{ 8 \cdot [5]^3 \right\} : [27 - 9 - 8] - 1 = \\
& = 4 - 3 + \left\{ 8 \cdot [5]^3 \right\} : [27 - 9 - 8] - 1 = \\
& = 4 - 3 + \{ 8 \cdot 125 \} : [18 - 8] - 1 = \\
& = 1 + \{ 1000 \} : [10] - 1 = \\
& = 1 + 100 - 1 = 100.
\end{aligned} \tag{24}$$

$$\begin{aligned}
& \{(8-14) + (30-32) \cdot (4+3) + [2 \cdot (-2)]\} : (-8+2) + [1 \cdot 6+ \\
& \qquad \qquad \qquad +4] : (-5) = \\
& = \{-6 + (-2) \cdot 7 + [-4]\} : -6 + [+6+4] : (-5) = \\
& = \{-6 - 2 \cdot 7 - 4\} : -6 + [+10] : (-5) = \\
& = \{-6 - 14 - 4\} : -6 - 2 = \\
& = -24 : -6 - 2 = 4 - 2 = 2.
\end{aligned} \tag{25}$$

$$\begin{aligned}
& \{[8 \cdot 2^0 + (24 : 2) : (-3) + 2] : [2 \cdot (-6) - 36 : (-12) + \\
& \qquad \qquad \qquad +7]\} \cdot (-1) - (8-3) = \\
& = \{[+8 + 12 : (-3) + 2] : [-12 + 3 + 7]\} \cdot (-1) - 5 = \\
& = \{[+8 - 4 + 2] : [-9 + 7]\} \cdot (-1) - 5 = \\
& = \{[+4 + 2] : [-2]\} \cdot (-1) - 5 = \\
& = \{6 : [-2]\} \cdot (-1) - 5 = \\
& = \{-3\} \cdot (-1) - 5 = \\
& = +3 - 5 = -2.
\end{aligned} \tag{26}$$

$$\begin{aligned}
& \{5 \cdot [2 \cdot 5 - 2 \cdot (7 \cdot 3 - 2 \cdot 10)] \cdot 8\} : (190 - 110) + [(4 + 45 : 3) : (3 + 2 \cdot 8)] = \\
& = \{5 \cdot [10 - 2 \cdot (21 - 20)] \cdot 8\} : 80 + [(4 + 15) : (3 + 16)] = \\
& = \{5 \cdot [10 - 2 \cdot (1)] \cdot 8\} : 80 + [19 : 19] = \\
& = \{5 \cdot [10 - 2] \cdot 8\} : 80 + 1 = \\
& = \{5 \cdot [8] \cdot 8\} : 80 + 1 = \\
& = \{40 \cdot 8\} : 80 + 1 = \\
& = 320 : 80 + 1 = 4 + 1 = 5.
\end{aligned} \tag{27}$$

$$\begin{aligned}
& -3 \cdot (-4) + (40 \cdot 2) + (-2) + (-8) \cdot (+5) + 5 \cdot [-7 - 1 \cdot 2^2 - 3] + \\
& \qquad \qquad \qquad -24 : 2 \cdot (-4) = \\
& = +12 + 80 - 2 - 40 + 5 \cdot [-7 - 4 - 3] - 12 \cdot (-4) = \\
& = 92 - 2 - 40 + 5 \cdot [-11 - 3] + 48 = \\
& = 90 - 40 + 5 \cdot [-14] + 48 = \\
& = 50 - 70 + 48 = -20 + 48 = 28.
\end{aligned} \tag{28}$$

$$\begin{aligned}
& \{(6-11) - [-(-1)]\} - \{[-(+5)] - [-(-7)]\} - \{-[-(-3)] - [+6^0 \cdot 6]\} = \\
& = \{-5 - [+1]\} - \{[-5] - [+7]\} - \{-[+3] - [+6]\} = \\
& = \{-5 - 1\} - \{-5 - 7\} - \{-3 - 6\} = \\
& = \{-6\} - \{-12\} - \{-9\} = \\
& = -6 + 12 + 9 = \\
& = +6 + 9 = 15.
\end{aligned} \tag{29}$$

$$\begin{aligned}
& (-6) \cdot (-3) + 30 + (-8) + (-4) \cdot (+5) + 7 \cdot [-5 - 1 \cdot 2^2 \cdot 3] + \\
& \qquad \qquad \qquad -6 \cdot 4 \cdot (-2) = \\
& = +18 + 30 - 8 - 20 + 7 \cdot [-5 - 4 \cdot 3] - 24 \cdot (-2) = \\
& \qquad \qquad \qquad = 48 - 8 - 20 + 7 \cdot [-5 - 12] + 48 = \qquad \qquad (30) \\
& \qquad \qquad \qquad = 40 - 20 + 7 \cdot [-17] + 48 = \\
& \qquad \qquad \qquad = 20 - 119 + 48 = \\
& \qquad \qquad \qquad = -99 + 48 = -51.
\end{aligned}$$

$$\begin{aligned}
& [(-3) \cdot (-9) + 7^2 : (-7)] : [(-12) : (+6) - 2] + (48 \cdot 2) : \{9 + [(-5) + \\
& \qquad \qquad \qquad -11 \cdot 2 \cdot 2] : (-7) - 4\} = \\
& = [+27 - 7] : [-2 - 2] + 96 : \{9 + [-5 - 22 \cdot 2] : (-7) - 4\} = \\
& \qquad \qquad \qquad = 20 : -4 + 96 : \{9 + [-5 - 44] : (-7) - 4\} = \qquad \qquad (31) \\
& \qquad \qquad \qquad = -5 + 96 : \{9 - 49 : (-7) - 4\} = \\
& \qquad \qquad \qquad = -5 + 96 : \{9 + 7 - 4\} = \\
& \qquad \qquad \qquad = -5 + 96 : \{16 - 4\} = \\
& \qquad \qquad \qquad = -5 + 96 : \{12\} = -5 + 8 = +3.
\end{aligned}$$

$$\begin{aligned}
& \{[(2^1)^2 + 60 : 2] : 2\} + 4 + 3^2 - (2^4 - 7^0) = \\
& = \{[(4)^2 + 30] : 2\} + 4 + 9 - (16 - 1) = \\
& \qquad \qquad \qquad = \{[16 + 30] : 2\} + 4 + 9 - (15) = \qquad \qquad (32) \\
& \qquad \qquad \qquad = \{46 : 2\} + 4 + 9 - 15 = \\
& \qquad \qquad \qquad = 23 + 4 + 9 - 15 = \\
& \qquad \qquad \qquad = 27 + 9 - 15 = 36 - 15 = 21.
\end{aligned}$$

$$\begin{aligned}
& (10 : 2)^3 - 6 \cdot 2^4 + [(4 - 2)^2 : 2^2 + 6] - 5^0 \cdot 3^3 : 3^2 = \\
& = (5)^3 - 6 \cdot 16 + [(2)^2 : 4 + 6] - 1 \cdot 27 : 9 = \\
& \qquad \qquad \qquad = 125 - 96 + [4 : 4 + 6] - 27 : 9 = \qquad \qquad (33) \\
& \qquad \qquad \qquad = 29 + [1 + 6] - 3 = \\
& \qquad \qquad \qquad = 29 + 7 - 3 = 36 - 3 = 33.
\end{aligned}$$

$$\begin{aligned}
& (40 - 5) + 2 \cdot [20 : 2 + 2 \cdot 2^2] : 2 - (17 + 8) - (3 \cdot 2^3 : 4 + 3^2 \cdot (2^0 \cdot 2)) = \\
& = 35 + 2 \cdot [10 + 2 \cdot 4] : 2 - 25 - (3 \cdot 8 : 4 + 9 \cdot 2) = \\
& \qquad \qquad \qquad = 35 + 2 \cdot [10 + 8] : 2 - 25 - (24 : 4 + 18) = \\
& \qquad \qquad \qquad = 35 + 2 \cdot [18] : 2 - 25 - (6 + 18) = \qquad \qquad (34) \\
& \qquad \qquad \qquad = 35 + 36 : 2 - 25 - (24) = \\
& \qquad \qquad \qquad = 35 + 18 - 25 - 24 = \\
& \qquad \qquad \qquad = 53 - 25 - 24 = 53 - 49 = 4.
\end{aligned}$$

$$\begin{aligned}
& [(6^3 \cdot 2^3 : 3^3) : (20^4 \cdot 10^4 - 8) \cdot 2^3] : (2^1)^6 = \\
& = [(12^3 : 3^3) : (2^4 - 8) \cdot 2^3] : 2^6 = \\
& = [4^3 : (16 - 8) \cdot 8] : 2^6 = \\
& = [4^3 : 8 \cdot 8] : 2^6 = \tag{35} \\
& = [4^3 : 2^3 \cdot 2^3] : 2^6 = \\
& = [2^3 \cdot 2^3] : 2^6 = \\
& = 2^6 : 2^6 = 2^0 = 1.
\end{aligned}$$

$$\begin{aligned}
& [(4^{10} : 4^6)^{3-1} \cdot (4^{10} : 4^5)] : 4^{11} + 1^9 - (2^2 \cdot 3 + 3^0) = \\
& = [(4^4)^2 \cdot (4^5)] : 4^{11} + 1 - (4 \cdot 3 + 1) = \\
& = [4^8 \cdot 4^5] : 4^{11} + 1 - (12 + 1) = \tag{36} \\
& = [4^{13}] : 4^{11} + 1 - (13) = \\
& = 4^2 + 1 - 13 = \\
& = 16 + 1 - 13 = 17 - 13 = 4.
\end{aligned}$$

$$\begin{aligned}
& (6^6 : 6^4 \cdot 36)^2 : (4 \cdot 3^2)^3 - [(2^{12})^1 : 4^4 + 8^0 \cdot 2^2] + 3^3 : 3 = \\
& = (6^2 \cdot 6^2)^2 : (2^2 \cdot 3^2)^3 - [2^{12} : 4^4 + 1 \cdot 2^2] + 3^2 = \\
& = (6^4)^2 : (6^2)^3 - [2^{12} : (2^2)^4 + 4] + 9 = \tag{37} \\
& = 6^8 : 6^6 - [2^{12} : 2^8 + 4] + 9 = \\
& = 6^2 - [2^4 + 4] + 9 = \\
& = 36 - [16 + 4] + 9 = \\
& = 36 - 20 + 9 = 16 + 9 = 25.
\end{aligned}$$

$$\begin{aligned}
& [(10^4 \cdot 1^4)^3 : (10^2)^5 - 5^2 \cdot 2] : [(5^2)^2 : 5^2] + 2^2 + (4 \cdot 2) = \\
& = [(10^4)^3 : (10^{10}) - 25 \cdot 2] : [(5^4) : 5^2] + 4 + 8 = \\
& = [10^{12} : 10^{10} - 25 \cdot 2] : [5^4 : 5^2] + 4 + 8 = \tag{38} \\
& = [10^2 - 50] : [5^2] + 4 + 8 = \\
& = [100 - 50] : 25 + 4 + 8 = \\
& = 50 : 25 + 12 = 2 + 12 = 14.
\end{aligned}$$

$$\begin{aligned}
& \left\{ \left[(6)^3 \cdot (3)^3 \right] : (2 \cdot 9)^2 \right\} : (-18) \cdot (-2) = \\
& = \left\{ \left[+18^3 \right] : 18^2 \right\} : (-18) \cdot (-2) = \\
& = \left\{ 18 \right\} : (-18) \cdot (-2) = \\
& = -1 \cdot (-2) = +2.
\end{aligned} \tag{39}$$

$$\begin{aligned}
& (3^2 \cdot 2^2) : 36 + (-2)^5 : (2)^2 + 11^1 = \\
& = 6^2 : 6^2 + (-2)^3 + 11 = \\
& = 6^0 - 2^3 + 11 = \\
& = 1 - 8 + 11 = -7 + 11 = 4.
\end{aligned} \tag{40}$$

$$\begin{aligned}
& \left\{ 4^2 : \left[3^2 \cdot 2^2 - 3 \cdot (3^4 : 3^2) - 2^4 : 2^3 + 2^2 - 3 \right] + 3 \right\}^2 = \\
& = \left\{ 16 : \left[6^2 - 3 \cdot 3^2 - 2^1 + 4 - 3 \right] + 3 \right\}^2 = \\
& = \left\{ 16 : \left[36 - 3^3 - 2 + 1 \right] + 3 \right\}^2 = \\
& = \left\{ 16 : \left[36 - 27 - 1 \right] + 3 \right\}^2 = \\
& = \left\{ 16 : \left[9 - 1 \right] + 3 \right\}^2 = \\
& = \left\{ 16 : 8 + 3 \right\}^2 = \\
& = \left\{ 2 + 3 \right\}^2 = \{5\}^2 = 25.
\end{aligned} \tag{41}$$

$$\begin{aligned}
& \left[4 \cdot 3 - (7 \cdot 3 - 5 \cdot 2) \right]^3 + \left[(-3)^2 \cdot (-4)^2 : 48 \right]^4 : (3)^3 - 2 = \\
& = \left[12 - (21 - 10) \right]^3 + \left[9 \cdot 16 : 48 \right]^4 : (3)^3 - 2 = \\
& = \left[12 - (11) \right]^3 + \left[144 : 48 \right]^4 : (3)^3 - 2 = \\
& = \left[1 \right]^3 + \left[3 \right]^4 : (3)^3 - 2 = \\
& = 1 + 3^1 - 2 = \\
& = 1 + 3 - 2 = 4 - 2 = 2.
\end{aligned} \tag{42}$$

$$\begin{aligned}
& \left\{ \left[(24 - 7 \cdot 3)^6 : (-3)^2 \right]^3 : (3)^6 \right\} : \left[(13 \cdot 1) - (2 + 20) \right]^2 - 43 + 7 = \\
& = \left\{ \left[(24 - 21)^6 : 3^2 \right]^3 : (3)^6 \right\} : \left[13 - (22) \right]^2 - 36 = \\
& = \left\{ \left[3^6 : 3^2 \right]^3 : (3)^6 \right\} : \left[-9 \right]^2 - 36 = \\
& = \left\{ \left[3^4 \right]^3 : (3)^6 \right\} : 9^2 - 36 = \\
& = \left\{ 3^{12} : 3^6 \right\} : (3^2)^2 - 36 = \\
& = \left\{ 3^6 \right\} : 3^4 - 36 = \\
& = 3^2 - 36 = 9 - 36 = -27.
\end{aligned} \tag{43}$$

$$\begin{aligned}
& [(-3^2)^3 \cdot (-3)^4] : [(3^2)^3 \cdot 9] = \\
& = [-(3^2)^3 \cdot (+3)^4] : [(3^6) \cdot (3)^2] = \\
& = [-3^6 \cdot 3^4] : [3^8] = \\
& = -3^{10} : 3^8 = -3^2 = -9.
\end{aligned} \tag{44}$$

$$\begin{aligned}
& [7^4 : 7^2 - (2 \cdot 7)^2 : 7] : [(7^2)^3 : 7^5] + (1^6 \cdot 6^6) : 6^5 + 6^2 = \\
& = [7^2 - (14)^2 : 7] : [7^6 : 7^5] + 6^6 : 6^5 + 6^2 = \\
& = [7^2 - 196 : 7] : 7^1 + 6^1 + 6^2 = \\
& = [49 - 28] : 7 + 6 + 36 = \\
& = 21 : 7 + 42 = \\
& = 3 + 42 = 45.
\end{aligned} \tag{45}$$

$$\begin{aligned}
& 0^4 - 10^5 : [(-5^2 : 5)^2 \cdot (-5)^3] : (-4 \cdot 1)^2 + [3^3 \cdot (-2)^3 : 36]^2 = \\
& = 0 - 10^5 : [(-5)^2 \cdot (-5)^3] : (-4)^2 + [-6^3 : 6^2]^2 = \\
& = -10^5 : [-5^5] : 16 + [-6^1]^2 = \\
& = +2^5 : 16 + [-6]^2 = \\
& = 32 : 16 + 36 = 2 + 36 = 38.
\end{aligned} \tag{46}$$

$$\begin{aligned}
& \{ [3^2 \cdot (30 - 27)^3] : (4 - 1)^3 \} : (-3) \cdot \{ [(-6)^2]^2 : 4^2 \} : 3^4 + (-2)^3 = \\
& = \{ [3^2 \cdot 3^3] : 3^3 \} : (-3) \cdot \{ [6^2]^2 : 2^4 \} : 3^4 - 8 = \\
& = \{ 3^5 : 3^3 \} : (-3) \cdot \{ 6^4 : 2^4 \} : 3^4 - 8 = \\
& = 3^2 : (-3) \cdot \{ 3^4 \} : 3^4 - 8 = \\
& = -3^1 \cdot 3^0 - 8 = \\
& = -3 \cdot 1 - 8 = -3 - 8 = -11.
\end{aligned} \tag{47}$$

$$\begin{aligned}
& \left\{ \left[(18 - 40 : 2) \cdot (-2)^2 \right]^4 : \left[(-2)^2 \right]^3 \right\} + \left[6 - 4 \cdot 7 \right]^3 : \left[(2)^5 - (-5)^2 \right]^2 = \\
& = \left\{ \left[(18 - 20) \cdot 4 \right]^4 : \left[2^2 \right]^3 \right\} + \left[2 \cdot 7 \right]^3 : \left[(2)^5 - 25 \right]^2 = \\
& = \left\{ \left[-2 \cdot 4 \right]^4 : 2^6 \right\} + 14^3 : \left[32 - 25 \right]^2 = \\
& = \left\{ \left[-8 \right]^4 : 2^6 \right\} + 14^3 : 7^2 = \tag{48} \\
& = \left\{ 8^4 : 2^6 \right\} + (2 \cdot 7)^3 : 7^2 = \\
& = \left\{ (2^3)^4 : 2^6 \right\} + 2^3 \cdot 7^3 : 7^2 = \\
& = 2^{12} : 2^6 + 2^3 \cdot 7^1 = \\
& = 2^6 + 2^3 \cdot 7 = \\
& = 64 + 8 \cdot 7 = 64 + 56 = 120.
\end{aligned}$$

$$\begin{aligned}
& \left\{ \left[(-3)^2 \cdot (-3)^4 \cdot (-3)^3 \right] : \left[(-3)^4 : 5^0 \right] \right\} : (-3)^3 = \\
& = \left\{ \left[3^6 \cdot (-3)^3 \right] : \left[3^4 : 1 \right] \right\} : -3^3 = \tag{49} \\
& = \left\{ -3^9 : 3^4 \right\} : -3^3 = \\
& = -3^5 : -3^3 = 3^2 = 9.
\end{aligned}$$

$$\begin{aligned}
& \left\{ 2 \cdot 6 - \left[+2 + 2^3 : (-2)^2 \cdot (2^7 : 2^6)^2 \right] : \left[(-2^2)^2 : 2^3 \right] \right\} \cdot 3 - 3^3 = \\
& = \left\{ 12 - \left[2 + 2^3 : 2^2 \cdot (2^1)^2 \right] : \left[(-4)^2 : 2^3 \right] \right\} \cdot 3 - 3^3 = \\
& = \left\{ 12 - \left[2 + 2^1 \cdot 2^2 \right] : \left[16 : 2^3 \right] \right\} \cdot 3 - 3^3 = \\
& = \left\{ 12 - \left[2 + 2^3 \right] : \left[2^4 : 2^3 \right] \right\} \cdot 3 - 3^3 = \\
& = \left\{ 12 - \left[2 + 8 \right] : \left[2^1 \right] \right\} \cdot 3 - 3^3 = \tag{50} \\
& = \left\{ 12 - \left[10 \right] : 2 \right\} \cdot 3 - 3^3 = \\
& = \left\{ 12 - 10 : 2 \right\} \cdot 3 - 3^3 = \\
& = \left\{ 12 - 5 \right\} \cdot 3 - 3^3 = \\
& = \left\{ 7 \right\} \cdot 3 - 27 = \\
& = 21 - 27 = -6.
\end{aligned}$$

$$\begin{aligned}
(2^5)^2 \cdot (-2)^3 &: \left\{ [-(-2)^2]^3 \cdot [-(-2)^2]^2 \right\} \cdot (-2^2) : (-2)^4 - (6^0 \cdot 0) = \\
&= 2^{10} \cdot (-2)^3 : \left\{ [-4]^3 \cdot [-4]^2 \right\} \cdot (-2^2) : 2^4 - 0 = \\
&= -2^{13} : \left\{ -4^5 \right\} \cdot (-2^2) : 2^4 = \\
&= -2^{13} : \left\{ -2^2 \right\}^5 \cdot (-2^2) : 2^4 = \\
&= -2^{13} : -2^{10} \cdot (-2^2) : 2^4 = \\
&= 2^3 \cdot (-2^2) : 2^4 = \\
&= -2^5 : 2^4 = -2^1 = -2.
\end{aligned} \tag{51}$$

$$\begin{aligned}
\left\{ [-(-3)^1]^{15} \cdot [(-3)^2]^5 \right\} &: \left\{ -(-3)^3 \cdot (-3)^7 \cdot [(-3)^2]^7 \right\} + (2^0 \cdot 1) = \\
&= \left\{ -(-3)^{15} \cdot (-3)^{10} \right\} : \left\{ -(+3)^{10} \cdot (-3)^{14} \right\} + 1 = \\
&= \left\{ 3^{15} \cdot (-3)^{10} \right\} : \left\{ -3^{10} \cdot 3^{14} \right\} + 1 = \\
&= \left\{ 3^{15} \cdot 3^{10} \right\} : \left\{ -3^{24} \right\} + 1 = \\
&= 3^{25} : -3^{24} + 1 = \\
&= -3^1 + 1 = -3 + 1 = -2.
\end{aligned} \tag{52}$$

$$\begin{aligned}
(2 + 45) + [(+3) + (-4)] &+ \{ (+6) + [(-2 \cdot 7) + (-13) + 3^2] - (17 \cdot 1) \} = \\
&= 47 + [3 - 4] + \{ 6 + [-14 - 13 + 9] - 17 \} = \\
&= 47 + [-1] + \{ 6 + [-27 + 9] - 17 \} = \\
&= 47 - 1 + \{ 6 + [-18] - 17 \} = \\
&= 46 + \{ 6 - 18 - 17 \} = \\
&= 46 + \{-12 - 17\} = \\
&= 46 + \{-29\} = 46 - 29 = 17.
\end{aligned} \tag{53}$$

$$\begin{aligned}
+3 \cdot 5 - \{ +7 + [-6 - (+18 - 9)] + 7^0 \} &+ \{ -[+6 - 4 + (3 - 2)] + 6 \} = \\
&= +15 - \{ +7 + [-6 - (9)] + 1 \} + \{ -[2 + (1)] + 6 \} = \\
&= +15 - \{ +7 + [-6 - 9] + 1 \} + \{ -[3] + 6 \} = \\
&= +15 - \{ +7 + [-15] + 1 \} + \{ -3 + 6 \} = \\
&= +15 - \{ +7 - 15 + 1 \} + \{ +3 \} = \\
&= +15 - \{ 8 - 15 \} + 3 = \\
&= +15 - \{-7\} + 3 = \\
&= +15 + 7 + 3 = 22 + 3 = 25.
\end{aligned} \tag{54}$$

$$\begin{aligned}
[15 - (9 \cdot 2 - 10^1) + 3] &: [2 \cdot (-4) - 2] + 7 \cdot [2 \cdot (-6) + 5] = \\
&= [15 - (18 - 10) + 3] : [-8 - 2] + 7 \cdot [-12 + 5] = \\
&= [15 - 8 + 3] : [-10] + 7 \cdot [-7] = \\
&= [7 + 3] : -10 - 49 = \\
&= 10 : -10 - 49 = -1 - 49 = -50.
\end{aligned} \tag{55}$$

$$\begin{aligned}
& 3^2 - 2 + 5 + [3 + 10 - 20 + (3 - 2 - 10)] + \\
& \quad + [32 + 10 - (36 + 5^0 + 12) + 7] = \\
= & 9 + 3 + [13 - 20 + (1 - 10)] + [42 - (37 + 12) + 7] = \\
& = 12 + [-7 + (-9)] + [42 - (49) + 7] = & (56) \\
& = 12 + [-7 - 9] + [42 - 49 + 7] = \\
& = 12 + [-16] + [-7 + 7] = \\
& = 12 - 16 + 0 = -4 + 0 = -4.
\end{aligned}$$

$$\begin{aligned}
& 7 \cdot 3 - 7 \cdot \{2 - [5 \cdot (10 - 9) - 2] + 6\} + 5 \cdot \{7 \cdot [6 \cdot 2^1 - \\
& \quad + 4 \cdot (2 + 1)] - 4\} = \\
= & 21 - 7 \cdot \{2 - [5 \cdot 1 - 2] + 6\} + 5 \cdot \{7 \cdot [6 \cdot 2 - 4 \cdot (3)] - 4\} = \\
& = 21 - 7 \cdot \{2 - [5 - 2] + 6\} + 5 \cdot \{7 \cdot [12 - 12] - 4\} = \\
& = 21 - 7 \cdot \{2 - 3 + 6\} + 5 \cdot \{7 \cdot 0 - 4\} = & (57) \\
& = 21 - 7 \cdot \{-1 + 6\} + 5 \cdot \{0 - 4\} = \\
& = 21 - 7 \cdot \{+5\} + 5 \cdot \{-4\} = \\
& = 21 - 35 - 20 = 1 - 35 = -34.
\end{aligned}$$

$$\begin{aligned}
& \left[(15^1)^4 : (5)^4 \right]^{7-1} : \left[-(-30)^{10} : (-10^2)^5 \right]^2 = \\
& = \left[15^4 : 5^4 \right]^6 : \left[-(30)^{10} : -10^{10} \right]^2 = \\
& = \left[3^4 \right]^6 : \left[-30^{10} : -10^{10} \right]^2 = & (58) \\
& = 3^{24} : \left[3^{10} \right]^2 = \\
& = 3^{24} : 3^{20} = 3^4 = 81.
\end{aligned}$$

$$\begin{aligned}
& \left[(6^{11} + 6^{10}) : (-6^5)^2 \right] \cdot (-7^8)^1 : (7)^6 = \\
= & \left[(6^{11} + 6^{10}) : (-6^{10}) \right] \cdot (-7)^8 : 7^6 = \\
& = \left[(6^{11} + 6^{10}) : 6^{10} \right] \cdot 7^8 : 7^6 = \\
= & \left[6^{11} : 6^{10} + 6^{10} : 6^{10} \right] \cdot 7^8 : 7^6 = & (59) \\
& = \left[6^1 + 6^0 \right] \cdot 7^8 : 7^6 = \\
& = \left[6 + 1 \right] \cdot 7^8 : 7^6 = \\
& = 7 \cdot 7^8 : 7^6 = \\
& = 7^9 : 7^6 = 7^3 = 343.
\end{aligned}$$

$$\begin{aligned}
& -\left[(125)^4 \cdot (5)^8\right] : \left[(5^2)^2\right]^5 + (-5)^9 : (625)^2 = \\
& = -\left[(5^3)^4 \cdot (5)^8\right] : [25^2]^5 + (-5)^9 : (5^4)^2 = \\
& = -[5^{12} \cdot 5^8] : 25^{10} - 5^9 : 5^8 = \tag{60} \\
& = -5^{20} : (5^2)^{10} - 5^1 = \\
& = -5^{20} : 5^{20} - 5 = \\
& = -5^0 - 5 = -1 - 5 = -6.
\end{aligned}$$

$$\begin{aligned}
& (17^9 - 17^8) : 17^8 \cdot [(-2)^4]^3 : [(-2^9) \cdot (-2)^1] = \\
& = (17^9 : 17^8 - 17^8 : 17^8) \cdot 2^{12} : [-2^{10}] = \\
& = (17^1 - 17^0) \cdot 2^{12} : [-2^{10}] = \tag{61} \\
& = (17 - 1) \cdot 2^{12} : -2^{10} = \\
& = 16 \cdot 2^{12} : -2^{10} = \\
& = 2^4 \cdot 2^{12} : -2^{10} = \\
& = 2^{16} : -2^{10} = -2^6 = 64.
\end{aligned}$$

$$\begin{aligned}
& [(16^3 + 8^4) : (-4)^4] : (-2)^3 + (5 - 4)^0 - 1 = \\
& = \left[\left((2^4)^3 + (2^3)^4\right) : (4)^4\right] : -2^3 + 1^0 - 1 = \\
& = \left[(2^{12} + 2^{12}) : (2^2)^4\right] : -2^3 + 1 - 1 = \tag{62} \\
& = [(2 \cdot 2^{12}) : 2^8] : -2^3 + 0 = \\
& = [2^{13} : 2^8] : -2^3 = \\
& = 2^5 : -2^3 = -2^2 = -4.
\end{aligned}$$

$$\begin{aligned}
& \left\{ [60^4 : (12)^4 : (5)^3]^2 \cdot [(-5)^3]^3 \right\} : [(-15)^5 : (3)^5]^2 = \\
& = \left\{ [5^4 : 5^3]^2 \cdot [-5]^9 \right\} : [(-5)^5]^2 = \\
& = \left\{ [5^1]^2 \cdot -5^9 \right\} : [(-5)^{10}] = \tag{63} \\
& = \left\{ 5^2 \cdot -5^9 \right\} : 5^{10} = \\
& = \left\{ -5^{11} \right\} : 5^{10} = -5^1 = -5.
\end{aligned}$$

$$\begin{aligned}
& -(6-4) + (2 \cdot 4^0) + \left[(-2^6 \cdot 4^2)^3 : (-64)^5 \right]^2 : \left[(4^2 \cdot 16^4)^2 : (-2^8)^5 \right] = \\
& = -2 + 2 \cdot 1 \left[(-2^6 \cdot (2^2)^2)^3 : -((+8)^2)^5 \right]^2 : \left[(4^2 \cdot (4^2)^4)^2 : (-2)^{40} \right] = \\
& = -2 + 2 + \left[(-2^6 \cdot 2^4)^3 : -(+8)^{10} \right]^2 : \left[(4^2 \cdot 4^8)^2 : 2^{40} \right] = \\
& = 0 + \left[(-2^{10})^3 : -(+2^3)^{10} \right]^2 : \left[(4^{10})^2 : 2^{40} \right] = \quad (64) \\
& = \left[2^{30} : -2^{30} \right]^2 : \left[((2^2)^{10})^2 : 2^{40} \right] = \\
& = [-2^0]^2 : \left[(2^{20})^2 : 2^{40} \right] = \\
& = -2^0 : [2^{40} : 2^{40}] = \\
& = -1 : 2^0 = -1 : 1 = -1.
\end{aligned}$$

$$\begin{aligned}
& \left\{ \left[(-5 \cdot 9)^4 \cdot 2^4 : (9 \cdot 2)^4 \right] : (-5^3) \right\}^4 : \left[(-25)^7 : (125)^4 \right] = \\
& = \left\{ \left[(45)^4 \cdot 2^4 : 18^4 \right] : -5^3 \right\}^4 : \left[-25^7 : ((5)^3)^4 \right] = \\
& = \left\{ \left[90^4 : 18^4 \right] : -5^3 \right\}^4 : \left[-(5^2)^7 : 5^{12} \right] = \quad (65) \\
& = \left\{ 5^4 : -5^3 \right\}^4 : \left[-5^{14} : 5^{12} \right] = \\
& = \left\{ -5^1 \right\}^4 : \left[-5^2 \right] = \\
& = 5^4 : -5^2 = -5^2 = -25.
\end{aligned}$$

$$\begin{aligned}
& \left[16 \cdot (-64)^3 \right] : \left[(-2^4)^5 \cdot 2^2 \right] \cdot (-8)^2 - 2^3 \cdot \left[(-16)^5 : (-2^3)^6 \right] = \\
& = \left[4^2 \cdot -(4^3)^3 \right] : \left[-2^{20} \cdot 2^2 \right] \cdot 2^6 - 2^3 \cdot \left[-(2^4)^5 : 2^{18} \right] = \\
& = \left[4^2 \cdot -(4^9) \right] : -2^{22} \cdot 2^6 - 2^3 \cdot \left[-2^{20} : 2^{18} \right] = \quad (66) \\
& = -4^{11} : -2^{22} \cdot 2^6 - 2^3 \cdot (-2^2) = \\
& = -2^{22} : -2^{22} \cdot 2^6 + 2^5 = \\
& = +2^0 \cdot 2^6 + 2^5 = \\
& = 1 \cdot 2^6 + 2^5 = 2^6 + 2^5 = 64 + 32 = 96.
\end{aligned}$$

$$\begin{aligned}
& \left[(-125)^2 : (4 + 2^0)^5 \right]^{10} : (-25)^4 + (-1 \cdot 10 + 3)^4 : \\
& \quad \left[125^3 : (-25)^4 + 3^0 + 1 \right]^3 = \\
& = \left[(-5^3)^2 : (4 + 1)^5 \right]^{10} : (5^2)^4 + (-10 + 3)^4 : \\
& \quad : \left[(5^3)^3 : (5^2)^4 + 1 + 1 \right]^3 = \tag{67} \\
& = \left[(-5)^6 : (5)^5 \right]^{10} : 5^8 + (-7)^4 : \left[5^9 : 5^8 + 2 \right]^3 = \\
& \quad = \left[5^1 \right]^{10} : 5^8 + 7^4 : \left[5^1 + 2 \right]^3 = \\
& \quad = 5^{10} : 5^8 + 7^4 : 7^3 = \\
& \quad = 5^2 + 7^1 = \\
& \quad = 25 + 7 = 32.
\end{aligned}$$

$$\begin{aligned}
& \left[(18)^{12} : 3^{12} - 6^4 \cdot 6^7 \right] : \left[(2)^{10} \cdot 3^{10} \right] + (9^6 - 27^3) : (-27)^3 + \\
& \quad + (-2)^{13} : (-4)^6 = \\
& = \left[6^{12} - 6^{11} \right] : \left[6^{10} \right] + \left((3^2)^6 - (3^3)^3 \right) : \left(-(3^3)^3 \right) - 2^{13} : (2^2)^6 = \\
& = \left[6^{12} : 6^{10} \right] - \left[6^{11} : 6^{10} \right] + \left(3^{12} - 3^9 \right) : -3^9 - 2^{13} : 2^{12} = \tag{68} \\
& = 6^2 - 6^1 + \left(3^{12} : -3^9 \right) + \left(-3^9 : -3^9 \right) - 2^1 = \\
& = 36 - 6 - 3^3 + 3^0 - 2 = \\
& = 30 - 27 + 1 - 2 = \\
& = 3 + 1 - 2 = 4 - 2 = 2.
\end{aligned}$$

$$\begin{aligned}
& \left[(4 \cdot +4)^2 \right]^4 : \left\{ \left[(-16)^6 \cdot (+16)^1 \right]^2 : \left[(-16)^2 \cdot \right. \right. \\
& \quad \left. \left. \cdot (-16)^5 \right\} \cdot (-16)^5 : \left[(+8)^2 \right]^3 = \\
& = (+16)^8 : \left\{ \left[16^6 \cdot 16^1 \right]^2 : \left[16^2 \cdot (-16)^5 \right] \right\} \cdot (-2^4)^5 : \left[(2^3)^2 \right]^3 = \\
& = (+16)^8 : \left\{ \left[16^7 \right]^2 : [-16^7] \right\} \cdot (-2^{20}) : (2^3)^6 = \tag{69} \\
& = 16^8 : \left\{ 16^{14} : [-16^7] \right\} \cdot (-2^{20}) : 2^{18} = \\
& = 16^8 : \{-16^7\} \cdot (-2^{20}) : 2^{18} = \\
& = -16^1 \cdot (-2^{20}) : 2^{18} = \\
& = -(2^4) \cdot (-2^{20}) : 2^{18} = \\
& = 2^{24} : 2^{18} = \\
& = 2^6 = 64.
\end{aligned}$$

$$\begin{aligned}
& \left\{ [(-3)^2]^3 \cdot [(-27)^3 \cdot 3^7] : [(3)^5]^4 + \right. \\
& \left. + [4^2]^3 \cdot [(+4)^{16} : (-4)^3 : (-4)^5]^3 : [(-4)^7]^4 \right\} - 5^2 = \\
= & \left\{ 3^6 \cdot [(-3^3)^3 \cdot 3^7] : 3^{20} + 4^6 \cdot [-4^{13} : -4^5]^3 : 4^{28} \right\} - 5^2 = \\
& = \left\{ 3^6 \cdot [(-3)^9 \cdot 3^7] : 3^{20} + 4^6 \cdot [4^8]^3 : 4^{28} \right\} - 5^2 = \tag{70} \\
& = \left\{ 3^6 \cdot (-3^{16}) : 3^{20} + 4^6 \cdot 4^{24} : 4^{28} \right\} - 5^2 = \\
& = \left\{ -3^{22} : 3^{20} + 4^{30} : 4^{28} \right\} - 5^2 = \\
& = \left\{ -3^2 + 4^2 \right\} - 5^2 = \\
& = \left\{ -9 + 16 \right\} - 25 = 7 - 25 = -18.
\end{aligned}$$

$$\begin{aligned}
& \left\{ [(-7)^3 \cdot (+49) \cdot (-49)^2] : [(-7)^2]^4 \cdot [(-7)^2]^6 \right\} \cdot \\
& \cdot \left\{ [27^2 \cdot 9^7]^2 : [(-3)^9]^3 \right\} : (-5^2 + 2^2 + 4^0 - 1)^{13} = \\
& = \left\{ [(-7)^3 \cdot 7^2 \cdot (7^2)^2] : [7^8] \cdot [7^{12}] \right\} \cdot \\
& \cdot \left\{ [(3^3)^2 \cdot (3^2)^7]^2 : [-3^{27}] \right\} : (-25 + 4 + 1 - 1)^{13} = \\
= & \left\{ [-7^5 \cdot 7^4] : 7^8 \cdot 7^{12} \right\} \cdot \left\{ [3^6 \cdot 3^{14}]^2 : -3^{27} \right\} : (-21 + 0)^{13} = \tag{71} \\
& = \left\{ -7^9 : 7^8 \cdot 7^{12} \right\} \cdot \left\{ [3^{20}]^2 : -3^{27} \right\} : (-21)^{13} = \\
& = \left\{ -7^1 \cdot 7^{12} \right\} \cdot \left\{ 3^{40} : -3^{27} \right\} : (-21)^{13} = \\
& = \left\{ -7^{13} \right\} \cdot \left\{ 3^{13} \right\} : (-21)^{13} = \\
& = 21^{13} : (-21)^{13} = \\
& = -21^0 = -1.
\end{aligned}$$

$$\begin{aligned}
& [(+4)^{11} \cdot (-3)^{11}]^2 : [(+16)^5 \cdot (-9)^5]^2 + \\
& -2^2 \cdot (2 \cdot 2 + 6^0)^2 - (9^3 : 3^5)^3 - (9 + 4 \cdot 4) = \\
= & [-12^{11}]^2 : [-144^5]^2 - 2^2 \cdot (4 + 1)^2 - \left((3^2)^3 : 3^5 \right)^3 - (9 + 16) = \\
& = 12^{22} : [(12^2)^5]^2 - 2^2 \cdot (5)^2 - (3^6 : 3^5)^3 - 25 = \tag{72} \\
& = 12^{22} : 12^{20} - 10^2 - (3^1)^3 - 25 = \\
& = 12^{22} : 12^{20} - 10^2 - 3^3 - 25 = \\
& = 12^2 - 100 - 27 - 25 = \\
& = 144 - 127 - 25 = \\
& = 17 - 25 = -8.
\end{aligned}$$

$$\begin{aligned}
& \left\{ \left[(-3)^7 \cdot (2 \cdot 2 + 3^0)^{4+3} \right] : (45^2 : 3^2) \right\}^2 : (81^2 : 9^3 + 6)^7 : (-5)^3 = \\
& = \left\{ \left[-3^7 \cdot (4+1)^7 \right] : (15^2) \right\}^2 : \left((9^2)^2 : 9^3 + 6 \right)^7 : (-5)^3 = \\
& = \left\{ \left[-3^7 \cdot 5^7 \right] : 15^2 \right\}^2 : (9^4 : 9^3 + 6)^7 : (-5)^3 = \\
& = \left\{ -15^7 : 15^2 \right\}^2 : (9^1 + 6)^7 : (-5)^3 = \\
& = \left\{ -15^5 \right\}^2 : 15^7 : (-5)^3 = \\
& = 15^{10} : 15^7 : (-5)^3 = \\
& = 15^3 : (-5)^3 = -3^3 = -27.
\end{aligned}
\tag{73}$$

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