

Espressioni con le quattro operazioni e le potenze. Livello intermedio UNO.

Completi di soluzione guidata.

Evaluating Expressions Involving Fractions – With solutions

1.  $\left(\frac{1}{2}\right)^2 + \left(\frac{1}{3}\right)^1 + \left(\frac{1}{2}\right)^2 - \left(\frac{2}{3}\right)^3 : \left(\frac{2}{3}\right)^2$  [1/6]  
[soluzione](#)
2.  $\left[\left(\frac{3}{2} - \frac{1}{3}\right)^2 : \left(2 - \frac{1}{2^2}\right)^2 \cdot \left(\frac{1}{3} - \frac{1}{2^2}\right)\right] : \left(\frac{2}{3}\right)^3$  [1/8]  
[soluzione](#)
3.  $\left(1 - \frac{1}{2}\right)^4 : \left\{\left[\left(\frac{3}{7} + \frac{1}{6} - \frac{5}{14}\right) \cdot \left(5 + \frac{1}{4}\right) - \frac{1}{2}\right]^3 : \left(\frac{3}{4}\right)^2 - \frac{1}{4}\right\} - \frac{1}{2}$  [0]  
[soluzione](#)
4.  $\left(3 - \frac{1}{4}\right) : \left[\left(\frac{2}{5} + \frac{1}{2} - \frac{5}{6}\right)^2 \cdot \left(\frac{7}{5} + \frac{1}{10} + \frac{7}{2}\right)^2\right] : \frac{3^2}{2}$  [11/2]  
[soluzione](#)
5.  $\left\{\frac{1}{2} + \left[\frac{1}{2} + \left(\frac{1}{2} + \frac{2}{6}\right) : \frac{10}{8}\right]\right\} : \left(\frac{3}{2}\right)^2 - \left(\frac{1}{2}\right)^4 : \left(\frac{1}{2}\right)^3$  [13/54]  
[soluzione](#)
6.  $\left[\left(\frac{3}{2} - \frac{3}{4}\right)^3 \cdot \left(\frac{8}{9}\right)^2 + \left(\frac{2}{3} + \frac{1}{2} + \frac{1}{6}\right)^2 \cdot \frac{3}{16}\right] \cdot \left(1 + \frac{1}{2}\right)^2$  [3/2]  
[soluzione](#)
7.  $\left[\left(\frac{15}{9} - \frac{1}{3}\right)^2 - \left(1 - \frac{1}{3}\right)^2 : \frac{3}{9}\right] : \left[\frac{16}{81} : \frac{16}{27} + \left(\frac{1}{9}\right)^2 : \frac{2}{30} + \frac{4}{27}\right]$  [2/3]  
[soluzione](#)
8.  $\left[\left(\frac{3}{4}\right)^3 : \left(\frac{3}{4}\right)^2 : \left(\frac{3}{4}\right) - \left(2 - \frac{2}{3}\right)^2 : \left(\frac{13}{6} + \frac{1}{2}\right) - \left(\frac{1}{7} - \frac{1}{21}\right)\right] : \left(\frac{1}{3} + \frac{3}{4} - \frac{13}{84}\right)$  [10/39]  
[soluzione](#)
9.  $\left(1 + \frac{1}{2}\right)^2 : \frac{5}{4} + \frac{9}{5} \cdot \left(2 - \frac{4}{3}\right)^2 - \left(2 - \frac{3}{5}\right) \cdot \frac{1}{7} - \left(1 - \frac{1}{2}\right)^3 : \frac{5}{8}$  [11/5]  
[soluzione](#)
10.  $\left\{\left[\left(\frac{19}{27} + 3\right) \cdot \frac{16}{5}\right] : \left[\frac{11}{18} \cdot \left(1 + \frac{31}{33}\right)\right]\right\}^2 \cdot \left(\frac{1}{10}\right)^2 + \left(\frac{1}{2}\right)^4 : \left(\frac{1}{2}\right)^2$  [5/4]  
[soluzione](#)
11.  $\left\{\left(\frac{15}{2^4} + \frac{21}{2^5} - 1\right) : \left[\frac{3}{2^2} - \left(\frac{1}{2^3} + \frac{1}{2^4}\right) + \frac{5}{2^3 \cdot 3}\right]\right\} : \frac{95}{74} + 2^2$  [23/5]  
[soluzione](#)
12.  $\left\{\left[\frac{15}{3} + \frac{3}{8} - \left(\frac{1}{2}\right)^3 - \frac{9}{2}\right] : \left[\left(\frac{4}{5}\right)^2 + \frac{3}{20} - \left(\frac{1}{5}\right)^2\right]\right\} - \left[\frac{19}{12} : \left(\frac{3}{4} + \frac{5}{6}\right)\right]$  [0]  
[soluzione](#)
13.  $\left[\left(3 + \frac{1}{2} - \frac{5}{3}\right) \cdot \left(\frac{1}{2}\right)^2\right] : \left\{\frac{3}{2} - \left[\frac{2}{3} + \left(\frac{2}{11} + \frac{5}{22} + \frac{7}{33}\right) : \frac{82}{33} + \frac{1}{12}\right]^5\right\}^3 : \frac{1}{4}$  [44/3]  
[soluzione](#)
14.  $\left\{\frac{15}{16} - \left[\left(\frac{3}{2} - \frac{1}{4}\right)^2 : \frac{5}{4} - \left(\frac{1}{2} + \frac{1}{4}\right)^2\right]\right\}^2 + \frac{1}{4}$  [5/16]  
[soluzione](#)

15.  $\left\{1 - \left[1 - \left(\frac{1}{6} + \frac{1}{3}\right)\right]\right\}^2 \cdot \left(\frac{1}{2} + \frac{3}{4}\right)^2 \cdot \left[2 - \frac{1}{3} \cdot \left(\frac{7}{10} + \frac{1}{2}\right)\right]^2$  [1]  
[soluzione](#)
16.  $\left\{\left[\left(\frac{1}{2} + \frac{1}{3}\right)^2 : \left(1 + \frac{1}{4}\right)^2\right] + \left[\left(\frac{4}{21} : \frac{8}{7} + \frac{12}{7} : \frac{3}{7}\right) : \left(2 - \frac{7}{6}\right)\right]\right\} : \left(\frac{7}{3}\right)^2$  [1]  
[soluzione](#)
17.  $\left[\frac{1}{3} - \left(\frac{3}{5} - \frac{1}{10}\right)^2\right] \cdot \frac{3}{5} : \frac{1}{2} + \frac{7}{4} : \frac{5}{2} - \frac{2^2}{5}$  [0]  
[soluzione](#)
18.  $\frac{10}{23} \cdot \left[\left(\frac{2}{7} : 7 + \frac{5}{49}\right)^2 : \frac{1}{7} - \left(\frac{1}{2} - \frac{1}{3}\right)^2 : \frac{5}{6}\right]$   $\left[\frac{1}{21}\right]$   
[soluzione](#)
19.  $\left[\left(\frac{5}{8} - \frac{1}{8}\right)^4 - \left(\frac{2}{11} \cdot \frac{22}{3} - 1\right)^4\right] : \left(\frac{1}{4} + \frac{1}{9}\right) \cdot \frac{6}{5}$   $\left[\frac{1}{6}\right]$   
[soluzione](#)
20.  $\left[\left(\frac{7}{13} \cdot \frac{26}{21}\right)^3 - \left(\frac{7}{5} : \frac{14}{5}\right)^3\right] : \left[\left(\frac{2}{3}\right)^2 + \frac{2}{3} : 2 + \frac{1}{4}\right]$   $\left[\frac{1}{6}\right]$   
[soluzione](#)
21.  $\left[\left(\frac{1}{2} + \frac{3}{4} - 1\right)^2 : \frac{3}{16} + \frac{3}{2} + \left(\frac{1}{4} - \frac{1}{5}\right) \cdot \left(\frac{15}{3} \cdot 2^2\right)\right] : \frac{1}{3}$   $\left[\frac{17}{2}\right]$   
[soluzione](#)
22.  $\left(1 - \frac{3}{7}\right) \cdot \left[\frac{2}{29} \cdot \left(\frac{11}{5} - \frac{3}{4}\right) + \left(\frac{3}{20} + \frac{4}{15} - \frac{3}{8}\right)^2 : \left(\frac{1}{3} - \frac{1}{4}\right)^2\right] : \left(\frac{4}{5}\right)^2 + \left(1 - \frac{1}{2}\right)^2$   $\left[\frac{9}{16}\right]$   
[soluzione](#)
23.  $\left[\left(2 + \frac{2}{3}\right) - \left(\frac{1}{3} + \frac{3}{4} - \frac{5}{6}\right) : \left(1 + \frac{1}{2}\right)^2\right] : \left[\left(1 - \frac{2}{5}\right)^2 \cdot \left(\frac{5}{3}\right)^2 + \frac{7}{2} \cdot \left(\frac{1}{3}\right)^2\right]$   $\left[\frac{46}{25}\right]$   
[soluzione](#)
24.  $\left[\left(\frac{1}{3}\right)^2 : \left(\frac{1}{6}\right)^2\right] \cdot \left[\left(\frac{1}{2}\right)^4 : \left(\frac{1}{15} : \frac{4}{15}\right)\right] : \left[\left(\frac{3}{2}\right)^2 - \left(1 - \frac{1}{2}\right)\right]$   $\left[\frac{4}{7}\right]$   
[soluzione](#)
25.  $\left\{\left[\left(\frac{1}{6} + \frac{1}{4}\right)^2 : \left(2 - \frac{1}{3}\right) + \frac{5}{12} - \frac{1}{2}\right] : \left(\frac{1}{4}\right)^2 - \frac{1}{3}\right\} + \frac{1}{4}$   $\left[\frac{1}{4}\right]$   
[soluzione](#)
26.  $\left\{\left[\left(\frac{5}{3}\right)^2 \cdot \left(1 - \frac{1}{2}\right) \cdot \left(1 + \frac{1}{5}\right)^2 \cdot \left(1 + \frac{1}{2}\right) - \frac{3}{4}\right] : \left(\frac{5}{2}\right)^2 - \left(\frac{1}{5}\right)^2\right\} : \left[\left(\frac{2}{5}\right)^3 : \left(\frac{2}{5}\right)^2\right] - \frac{1}{20}$   $\left[\frac{3}{4}\right]$   
[soluzione](#)
27.  $\left\{\frac{2}{3} - \left[\left(\frac{1}{2^3} + \frac{1}{2^2}\right) \cdot \frac{2}{3}\right]\right\} : \left[3 + \left(\frac{1}{3}\right)^4 : \left(\frac{1}{3}\right)^3\right] + \left[\left(\frac{1}{3}\right)^0 + \left(\frac{1}{3}\right)^5 : \left(\frac{1}{3}\right)^4\right] \cdot \left(\frac{1}{2}\right)^3$   $\left[\frac{7}{24}\right]$   
[soluzione](#)

28.  $\left(3 - \frac{10}{7}\right) : \left[\left(1 + \frac{1}{2}\right) - \left(1 - \frac{1}{3}\right)^2 \cdot \left(\frac{3}{20} + \frac{6}{35}\right)\right] : \left[\frac{11}{3} - \left(1 - \frac{1}{3}\right)\right]$   $\left[\frac{2}{3}\right]$   
[soluzione](#)
29.  $\left[\frac{5^2}{90} \cdot \left(\frac{2}{5}\right)^3 : \left(\frac{2}{5}\right)^2 + \frac{1}{2} \cdot \left(\frac{1}{3}\right)^4 : \left(\frac{1}{3}\right)^3\right] : \left[\left(1 + \frac{2}{3} - \frac{11}{3^2}\right)^2 : \frac{4}{9}\right]$   $\left[\frac{5}{8}\right]$   
[soluzione](#)
30.  $\left[\left(\frac{1}{3}\right)^3 : \left(\frac{1}{3}\right)^2 \cdot \left(\frac{1}{3} + \frac{1}{2}\right) : 5 + \left(\frac{1}{9}\right)^4 : \left(\frac{1}{9}\right)^3\right] \cdot \frac{1}{3} + \frac{5}{6} - \left(1 - \frac{2}{3}\right)^2 =$   $\left[\frac{7}{9}\right]$   
[soluzione](#)
31.  $\left[\left(\frac{1}{2}\right)^2 : \left(\frac{1}{2}\right)^3\right] \cdot \left[\frac{3}{2} - \left(\frac{4}{9}\right)^2 : \left(1 - \frac{5}{9}\right)^2\right]$  [soluzione](#)
32.  $\left\{\left[\left(\frac{2}{3}\right)^3 : \left(\frac{4}{3}\right)^3 + \frac{7}{8} \cdot \left(\frac{1}{4}\right)^0\right]^2 : \left(\frac{7}{8}\right)^1 - \frac{1}{7}\right\} : \frac{4}{5} - \frac{1}{2}$  [soluzione](#)
33.  $\left(\frac{1}{4}\right)^2 : \left(\frac{1}{4}\right)^2 + \left(\frac{1}{2}\right)^2 + \frac{4}{3} - \left(\frac{4}{3}\right)^3 : \left(\frac{4}{3}\right)^2 - \left(\frac{1}{2}\right)^1$  [soluzione](#)
34.  $\left(\frac{1}{2}\right)^0 + \left[\left(\frac{3}{2} - \frac{1}{4}\right)^2 - \left(1 - \frac{1}{4}\right)^2\right] : \left(\frac{3}{2}\right)^2 - \left(\frac{1}{2}\right)^1$  [soluzione](#)
35.  $\left(\frac{2}{3} + \frac{2}{6}\right)^1 + \left[\left(\frac{3}{5} - \frac{1}{10}\right)^2 : \left(1 - \frac{1}{3}\right)^2\right] - \left(\frac{1}{2} + \frac{2}{3}\right)^0 - \left(\frac{5}{16}\right)^5 : \left(\frac{5}{16}\right)^4$  [soluzione](#)

## Soluzioni

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$$\left(\frac{1}{2}\right)^2 + \left(\frac{1}{3}\right)^1 + \left(\frac{1}{2}\right)^2 - \left(\frac{2}{3}\right)^3 : \left(\frac{2}{3}\right)^2 =$$

Svolgo prima le potenze. Ricorda che  $a^1 = a$

Ricorda che  $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$        $\left(\frac{1}{2}\right)^2 = \frac{1}{2} \cdot \frac{1}{2} = \frac{1^2}{2^2} = \frac{1}{4}$

$$= \frac{1^2}{2^2} + \frac{1}{3} + \frac{1^2}{2^2} - \frac{8}{27} \cdot \frac{9}{4} =$$

Eseguo le potenze.

Eseguo la semplificazione in croce della moltiplicazione (8 con 4 (2 e 1) e 9 con 27 (1 e 3))

$$= \frac{1}{4} + \frac{1}{3} + \frac{1}{4} - \frac{2}{3} =$$

Eseguo le addizioni e le sottrazioni, ricercando il minimo comune multiplo dei denominatori (m.c.m. (4, 3) = 12) e applicando l'algoritmo di calcolo.

$$= \frac{3 + 4 + 3 - 8}{12} =$$

$$= \frac{2}{12} =$$

La frazione è riducibile (M.C.D.(2, 12) = 2),

$$= \frac{1}{6}$$

$$\left[ \left( \frac{3}{2} - \frac{1}{3} \right)^2 : \left( 2 - \frac{1}{2^2} \right)^2 \cdot \left( \frac{1}{3} - \frac{1}{2^2} \right) \right] : \left( \frac{2}{3} \right)^3 =$$

Eseguo prima le addizioni e le sottrazioni nella parentesi rotonde, ricercando il minimo comune multiplo dei denominatori (m.c.m. (2, 3) = 6 e m.c.m.(3, 4) = 12).

$$= \left[ \left( \frac{9-2}{6} \right)^2 : \left( \frac{8-1}{4} \right)^2 \cdot \frac{4-3}{12} \right] : \frac{8}{27} =$$

Trasformo la divisione in una moltiplicazione per l'inverso del divisore. (8/27 -> 1/x -> 27/8)

$$= \left[ \frac{49}{36_9} \cdot \frac{16^4}{49} \cdot \frac{1}{12} \right] \cdot \frac{27}{8} =$$

Eseguo la moltiplicazione semplificando "in croce" (49 con 49 e 16 con 36).

$$= \frac{4}{9} \cdot \frac{1}{12} \cdot \frac{27^3}{8_2} =$$

Eseguo la moltiplicazione semplificando "in croce"

$$= \frac{1}{12_4} \cdot \frac{3}{2} =$$

Eseguo ancora la semplificazione in croce della moltiplicazione (3 e 12).

$$= \frac{1}{8}$$

$$\left(1 - \frac{1}{2}\right)^4 : \left\{ \left[ \left( \frac{3}{7} + \frac{1}{6} - \frac{5}{14} \right) \cdot \left( 5 + \frac{1}{4} \right) - \frac{1}{2} \right]^3 : \left( \frac{3}{4} \right)^2 - \frac{1}{4} \right\} - \frac{1}{2} =$$

Alle potenze applico la definizione di elevamento a potenza

$$\left(1 - \frac{1}{2}\right)^4 = \left(\frac{1}{2}\right)^4 = \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1^4}{2^4} = \frac{1}{16} \qquad \left(\frac{3}{4}\right)^2 = \frac{3}{4} \cdot \frac{3}{4} = \frac{3^2}{4^2} = \frac{9}{16}$$

$$= \frac{1}{16} : \left\{ \left[ \left( \frac{18 + 7 - 15}{42} \right) \cdot \frac{21}{4} - \frac{1}{2} \right]^3 : \frac{9}{16} - \frac{1}{4} \right\} - \frac{1}{2} =$$

$$= \frac{1}{16} : \left\{ \left[ \frac{10}{42} \cdot \frac{21}{4} - \frac{1}{2} \right]^3 : \frac{9}{16} - \frac{1}{4} \right\} - \frac{1}{2} =$$

$$= \frac{1}{16} : \left\{ \left[ \frac{5}{4} - \frac{1}{2} \right]^3 : \frac{9}{16} - \frac{1}{4} \right\} - \frac{1}{2} =$$

$$= \frac{1}{16} : \left\{ \left[ \frac{5 - 2}{4} \right]^3 : \left( \frac{3}{4} \right)^2 - \frac{1}{4} \right\} - \frac{1}{2} =$$

$$= \frac{1}{16} : \left\{ \left( \frac{3}{4} \right)^3 : \left( \frac{3}{4} \right)^2 - \frac{1}{4} \right\} - \frac{1}{2} =$$

Applico la proprietà del quoziente di potenze con la stessa base

$$a^m : a^n = a^{m-n} \qquad a^1 = a \qquad \forall a \in \mathbb{Q}$$

$$= \frac{1}{16} : \left\{ \left( \frac{3}{4} \right)^{3-2} - \frac{1}{4} \right\} - \frac{1}{2} =$$

$$= \frac{1}{16} : \left\{ \frac{3}{4} - \frac{1}{4} \right\} - \frac{1}{2} =$$

$$= \frac{1}{16} : \left\{ \frac{1}{2} \right\} - \frac{1}{2} =$$

$$= \frac{1}{16} : \frac{1}{8} - \frac{1}{2} =$$

$$= \frac{1}{2} - \frac{1}{2} = 0$$

$$\left(3 - \frac{1}{4}\right) : \left[\left(\frac{2}{5} + \frac{1}{2} - \frac{5}{6}\right)^2 \cdot \left(\frac{7}{5} + \frac{1}{10} + \frac{7}{2}\right)^2\right] : \frac{3^2}{2}$$

Eseguo i calcoli nelle parentesi e applico la definizione di elevamento a potenza

$$\begin{aligned} \frac{3^2}{2} &= \frac{3 \cdot 3}{2} = \frac{9}{2} \quad \text{ricorda che } \frac{3^2}{2} \neq \left(\frac{3}{2}\right)^2 = \frac{9}{4} \\ &= \left(\frac{12-1}{4}\right) : \left[\left(\frac{12+15-25}{30}\right)^2 \cdot \left(\frac{14+1+35}{10}\right)^2\right] : \frac{9}{2} = \\ &= \frac{11}{4} : \left[\left(\frac{2^1}{30_{15}}\right)^2 \cdot \left(\frac{50}{10}\right)^2\right] : \frac{9}{2} = \\ &= \frac{11}{4} : \left[\left(\frac{1}{15}\right)^2 \cdot \left(\frac{5}{1}\right)^2\right] : \frac{9}{2} = \end{aligned}$$

Applico la proprietà del prodotto di potenze con lo stesso esponente

$$\begin{aligned} a^m \cdot b^m &= (a \cdot b)^m \quad \forall a, b \in \mathbb{Q} \\ &= \frac{11}{4} : \left(\frac{1}{3 \cdot 15} \cdot \frac{5^1}{1}\right)^2 : \frac{9}{2} = \\ &= \frac{11}{4} : \left(\frac{1}{3}\right)^2 : \frac{9}{2} = \\ &= \frac{11}{4} : \frac{1}{9} : \frac{9}{2} = \end{aligned}$$

Trasformo le divisioni in moltiplicazioni.

$$= \frac{11}{4} \cdot \frac{9}{1} \cdot \frac{2}{9} = \frac{11}{2}$$

$$\left\{ \frac{1}{2} + \left[ \frac{1}{2} + \left( \frac{1}{2} + \frac{2}{6} \right) : \frac{10}{8} \right] \right\} : \left( \frac{3}{2} \right)^2 - \left( \frac{1}{2} \right)^4 : \left( \frac{1}{2} \right)^3 =$$

Applico la proprietà del quoziente di potenze con la stessa base

$$a^m : a^n = a^{m-n} \quad \forall a \in \mathbb{Q}$$

$$= \left\{ \frac{1}{2} + \left[ \frac{1}{2} + \left( \frac{3+2}{6} \right) : \frac{10}{8} \right] \right\} : \frac{9}{4} - \left( \frac{1}{2} \right)^{4-3} =$$

$$= \left\{ \frac{1}{2} + \left[ \frac{1}{2} + \left( \frac{3+2}{6} \right) : \frac{10^5}{8_4} \right] \right\} \cdot \frac{4}{9} - \left( \frac{1}{2} \right)^1 =$$

Ricorda che  $a^1 = a$  per  $\forall a \in \mathbb{Q}$

$$= \left\{ \frac{1}{2} + \left[ \frac{1}{2} + \left( \frac{3+2}{6} \right) : \frac{10^5}{8_4} \right] \right\} \cdot \frac{4}{9} - \frac{1}{2} =$$

$$= \left\{ \frac{1}{2} + \left[ \frac{1}{2} + \frac{5^1}{3_6} \cdot \frac{4^2}{5^1} \right] \right\} \cdot \frac{4}{9} - \frac{1}{2} =$$

$$= \left\{ \frac{1}{2} + \left[ \frac{1}{2} + \frac{2}{3} \right] \right\} \cdot \frac{4}{9} - \frac{1}{2} =$$

$$= \left\{ \frac{1}{2} + \left[ \frac{3+4}{6} \right] \right\} \cdot \frac{4}{9} - \frac{1}{2} =$$

$$= \left\{ \frac{1}{2} + \frac{7}{6} \right\} \cdot \frac{4}{9} - \frac{1}{2} =$$

$$= \left\{ \frac{3+7}{6} \right\} \cdot \frac{4}{9} - \frac{1}{2} =$$

$$= \left( \frac{10}{6_3} \right) \cdot \frac{4^2}{9} - \frac{1}{2} =$$

$$= \frac{20}{27} - \frac{1}{2} =$$

$$= \frac{40 - 27}{54} = \frac{13}{54}$$



$$\begin{aligned} & \left[ \left( \frac{3}{2} - \frac{3}{4} \right)^3 \cdot \left( \frac{8}{9} \right)^2 + \left( \frac{2}{3} + \frac{1}{2} + \frac{1}{6} \right)^2 \cdot \frac{3}{16} \right] \cdot \left( 1 + \frac{1}{2} \right)^2 = \\ & = \left[ \left( \frac{6-3}{4} \right)^3 \cdot \left( \frac{8}{9} \right)^2 + \left( \frac{4+3+1}{6} \right)^2 \cdot \frac{3}{16} \right] \cdot \left( \frac{2+1}{2} \right)^2 = \\ & = \left[ \left( \frac{3}{4} \right)^3 \cdot \left( \frac{8}{9} \right)^2 + \left( \frac{8^4}{6^3} \right)^2 \cdot \frac{3}{16} \right] \cdot \left( \frac{3}{2} \right)^2 = \end{aligned}$$

Ricorda che  $\left( \frac{a}{b} \right)^n = \frac{a^n}{b^n}$

$$\begin{aligned} & = \left[ \frac{27}{64} \cdot \frac{64}{81} + \frac{16}{9} \cdot \frac{3}{16} \right] \cdot \frac{9}{4} = \\ & = \left[ \frac{27^{3^1}}{81_{9^3}} + \frac{3}{9} \right] \cdot \frac{9}{4} = \\ & = \left[ \frac{1}{3} + \frac{1}{3} \right] \cdot \frac{9}{4} = \\ & = \frac{2}{3} \cdot \frac{9}{4} = \frac{3}{2} \end{aligned}$$

$$\begin{aligned}
 & \left[ \left( \frac{15}{9} - \frac{1}{3} \right)^2 - \left( 1 - \frac{1}{3} \right)^2 : \frac{3}{9} \right] : \left[ \frac{16}{81} : \frac{16}{27} + \left( \frac{1}{9} \right)^2 : \frac{2}{30} + \frac{4}{27} \right] = \\
 & \left[ \left( \frac{15-3}{9} \right)^2 - \left( \frac{3-1}{3} \right)^2 : \frac{3}{9} \right] : \left[ \frac{16}{81} : \frac{16}{27} + \frac{1}{81} : \frac{2^1}{30_{15}} + \frac{4}{27} \right] = \\
 & = \left[ \left( \frac{12^4}{9^3} \right)^2 - \left( \frac{2}{3} \right)^2 : \frac{3}{9} \right] : \left[ \frac{16}{3 \cdot 81} \cdot \frac{27^1}{16} + \frac{1}{81_{27}} \cdot \frac{15^5}{1} + \frac{4}{27} \right] = \\
 & = \left[ \frac{16}{9} - \frac{4}{9} \cdot \frac{9}{3} \right] : \left[ \frac{1}{3} + \frac{5}{27} + \frac{4}{27} \right] = \\
 & = \left[ \frac{16}{9} - \frac{4}{3} \right] : \left[ \frac{9+5+4}{27} \right] = \\
 & = \left[ \frac{16-12}{9} \right] : \frac{18^2}{27_3} = \\
 & = \frac{4}{9} : \frac{2}{3} = \frac{4}{9} \cdot \frac{3}{2} = \frac{2}{3}
 \end{aligned}$$

$$\begin{aligned}
 & \left[ \left(\frac{3}{4}\right)^3 : \left(\frac{3}{4}\right)^2 : \left(\frac{3}{4}\right) - \left(2 - \frac{2}{3}\right)^2 : \left(\frac{13}{6} + \frac{1}{2}\right) - \left(\frac{1}{7} - \frac{1}{21}\right) \right] : \left(\frac{1}{3} + \frac{3}{4} - \frac{13}{84}\right) = \\
 & = \left[ \left(\frac{3}{4}\right)^{3-2-1} - \left(\frac{6-2}{3}\right)^2 : \left(\frac{13+3}{6}\right) - \left(\frac{3-1}{21}\right) \right] : \left(\frac{28+63-13}{84}\right) = \\
 & = \left[ \left(\frac{3}{4}\right)^0 - \left(\frac{4}{3}\right)^2 : \frac{16}{6} - \frac{2}{21} \right] : \frac{78}{84} = \\
 & = \left[ 1 - \frac{16}{9} \cdot \frac{6}{16} - \frac{2}{21} \right] : \frac{13}{14} = \\
 & = \left[ 1 - \frac{1}{3} \cdot \frac{2}{1} - \frac{2}{21} \right] \cdot \frac{14}{13} = \\
 & = \left[ 1 - \frac{2}{3} - \frac{2}{21} \right] \cdot \frac{14}{13} = \\
 & = \left[ \frac{21-14-2}{21} \right] \cdot \frac{14}{13} = \\
 & = \frac{5}{21} \cdot \frac{14}{13} = \\
 & = \frac{5}{3} \cdot \frac{2}{13} = \frac{10}{39}
 \end{aligned}$$

$$\begin{aligned}
 & \left(1 + \frac{1}{2}\right)^2 \cdot \frac{5}{4} + \frac{9}{5} \cdot \left(2 - \frac{4}{3}\right)^2 - \left(2 - \frac{3}{5}\right) \cdot \frac{1}{7} - \left(1 - \frac{1}{2}\right)^3 \cdot \frac{5}{8} = \\
 & = \left(\frac{2+1}{2}\right)^2 \cdot \frac{4}{5} + \frac{9}{5} \cdot \left(\frac{6-4}{3}\right)^2 - \left(\frac{10-3}{5}\right) \cdot \frac{1}{7} - \left(\frac{2-1}{2}\right)^3 \cdot \frac{8}{5} = \\
 & = \left(\frac{3}{2}\right)^2 \cdot \frac{4}{5} + \frac{9}{5} \cdot \left(\frac{2}{3}\right)^2 - \left(\frac{7}{5}\right) \cdot \frac{1}{7} - \left(\frac{1}{2}\right)^3 \cdot \frac{8}{5} = \\
 & = \frac{9}{4} \cdot \frac{4}{5} + \frac{9}{5} \cdot \frac{4}{9} - \frac{1}{5} - \frac{1}{8} \cdot \frac{8}{5} = \\
 & = \frac{9}{5} + \frac{4}{5} - \frac{1}{5} - \frac{1}{5} = \\
 & = \frac{9+4-1-1}{5} = \frac{11}{5}
 \end{aligned}$$

$$\begin{aligned}
 & \left\{ \left[ \left( \frac{19}{27} + 3 \right) \cdot \frac{16}{5} \right] : \left[ \frac{11}{18} \cdot \left( 1 + \frac{31}{33} \right) \right] \right\}^2 \cdot \left( \frac{1}{10} \right)^2 + \left( \frac{1}{2} \right)^4 : \left( \frac{1}{2} \right)^2 = \\
 & = \left\{ \left[ \left( \frac{19+81}{27} \right) \cdot \frac{16}{5} \right] : \left[ \frac{11}{18} \cdot \left( \frac{33+31}{33} \right) \right] \right\}^2 \cdot \left( \frac{1}{100} \right) + \left( \frac{1}{2} \right)^{4-2} = \\
 & = \left\{ \left[ \left( \frac{100}{27} \right) \cdot \frac{16}{5} \right] : \left[ \frac{11}{18} \cdot \left( \frac{64}{33} \right) \right] \right\}^2 \cdot \left( \frac{1}{100} \right) + \left( \frac{1}{2} \right)^2 = \\
 & = \left\{ \left( \frac{20}{27} \right) \cdot \frac{16}{1} : \left[ \frac{1}{9} \cdot \left( \frac{32}{3} \right) \right] \right\}^2 \cdot \left( \frac{1}{100} \right) + \frac{1}{4} = \\
 & = \left\{ \frac{20}{27} \cdot \frac{16}{1} \cdot \frac{27}{32} \right\}^2 \cdot \left( \frac{1}{100} \right) + \frac{1}{4} = \\
 & = \left\{ \frac{20}{1} \cdot \frac{1}{1} \cdot \frac{1}{2} \right\}^2 \cdot \left( \frac{1}{100} \right) + \frac{1}{4} = \\
 & = \left\{ \frac{10}{1} \right\}^2 \cdot \left( \frac{1}{100} \right) + \frac{1}{4} = \\
 & = 1 + \frac{1}{4} = \frac{5}{4}
 \end{aligned}$$

$$\begin{aligned}
 & \left\{ \left( \frac{15}{2^4} + \frac{21}{2^5} - 1 \right) : \left[ \frac{3}{2^2} - \left( \frac{1}{2^3} + \frac{1}{2^4} \right) + \frac{5}{2^3 \cdot 3} \right] \right\} : \frac{95}{74} + 2^2 = \\
 & = \left\{ \left( \frac{15}{16} + \frac{21}{32} - 1 \right) : \left[ \frac{3}{4} - \left( \frac{1}{8} + \frac{1}{16} \right) + \frac{5}{8 \cdot 3} \right] \right\} \cdot \frac{74}{95} + 4 = \\
 & = \left\{ \left( \frac{30+21-32}{32} \right) : \left[ \frac{3}{4} - \left( \frac{2+1}{16} \right) + \frac{5}{24} \right] \right\} \cdot \frac{74}{95} + 4 = \\
 & = \left\{ \frac{19}{32} : \left[ \frac{3}{4} - \frac{3}{16} + \frac{5}{24} \right] \right\} \cdot \frac{74}{95} + 4 = \\
 & = \left\{ \frac{19}{32} : \left[ \frac{36-9+10}{48} \right] \right\} \cdot \frac{74}{95} + 4 = \\
 & = \left\{ \frac{19}{32} : \left[ \frac{37}{48} \right] \right\} \cdot \frac{74}{95} + 4 = \\
 & = \left\{ \frac{19}{32} \cdot \frac{48^3}{37^3} \right\} \cdot \frac{74^2}{95} + 4 = \\
 & = \frac{19}{2} \cdot \frac{3}{1} \cdot \frac{2}{95} + 4 = \\
 & = \frac{3}{5} + 4 = \\
 & = \frac{3+20}{5} = \frac{23}{5}
 \end{aligned}$$

$$\begin{aligned}
 & \left\{ \left[ \frac{15}{3} + \frac{3}{8} - \left( \frac{1}{2} \right)^3 - \frac{9}{2} \right] : \left[ \left( \frac{4}{5} \right)^2 + \frac{3}{20} - \left( \frac{1}{5} \right)^2 \right] \right\} - \left[ \frac{19}{12} : \left( \frac{3}{4} + \frac{5}{6} \right) \right] = \\
 & = \left\{ \left[ 5 + \frac{3}{8} - \frac{1}{8} - \frac{9}{2} \right] : \left[ \frac{16}{25} + \frac{3}{20} - \frac{1}{25} \right] \right\} - \left[ \frac{19}{12} : \left( \frac{9+10}{12} \right) \right] = \\
 & = \left\{ \left[ \frac{40+3-1-36}{8} \right] : \left[ \frac{64+15-4}{100} \right] \right\} - \left[ \frac{19 \cdot 12}{12 \cdot 19} \right] = \\
 & = \left\{ \frac{6}{8} : \frac{75}{100} \right\} - 1 = \\
 & = \left\{ \frac{3}{4} : \frac{3}{4} \right\} - 1 = \\
 & = 1 - 1 = 0
 \end{aligned}$$

$$\begin{aligned}
 & \left[ \left( 3 + \frac{1}{2} - \frac{5}{3} \right) \cdot \left( \frac{1}{2} \right)^2 \right] : \left\{ \frac{3}{2} - \left[ \frac{2}{3} + \left( \frac{2}{11} + \frac{5}{22} + \frac{7}{33} \right) : \frac{82}{33} + \frac{1}{12} \right]^5 \right\}^3 : \frac{1}{4} = \\
 & = \left[ \left( \frac{18+3-10}{6} \right) \cdot \frac{1}{4} \right] : \left\{ \frac{3}{2} - \left[ \frac{2}{3} + \left( \frac{12+15+14}{66} \right) \cdot \frac{33}{82} + \frac{1}{12} \right]^5 \right\}^3 \cdot 4 = \\
 & = \left[ \frac{11}{6} \cdot \frac{1}{4} \right] : \left\{ \frac{3}{2} - \left[ \frac{2}{3} + \left( \frac{41}{66} \right) \cdot \frac{33}{82} + \frac{1}{12} \right]^5 \right\}^3 \cdot 4 = \\
 & = \frac{11}{24} : \left\{ \frac{3}{2} - \left[ \frac{2}{3} + \frac{1}{4} + \frac{1}{12} \right]^5 \right\}^3 \cdot 4 = \\
 & = \frac{11}{24} : \left\{ \frac{3}{2} - \left[ \frac{8+3+1}{12} \right]^5 \right\}^3 \cdot 4 = \\
 & = \frac{11}{24} : \left\{ \frac{3}{2} - \left[ \frac{12}{12} \right]^5 \right\}^3 \cdot 4 = \\
 & = \frac{11}{24} : \left\{ \frac{1}{2} \right\}^3 \cdot 4 = \\
 & = \frac{11}{24} \cdot 8 \cdot 4 = \frac{44}{3}
 \end{aligned}$$

$$\begin{aligned}
 & \left\{ \frac{15}{16} - \left[ \left( \frac{3}{2} - \frac{1}{4} \right)^2 : \frac{5}{4} - \left( \frac{1}{2} + \frac{1}{4} \right)^2 \right] \right\}^2 + \frac{1}{4} = \\
 & = \left\{ \frac{15}{16} - \left[ \left( \frac{6-1}{4} \right)^2 \cdot \frac{4}{5} - \left( \frac{2+1}{4} \right)^2 \right] \right\}^2 + \frac{1}{4} = \\
 & = \left\{ \frac{15}{16} - \left[ \left( \frac{5}{4} \right)^2 \cdot \frac{4}{5} - \left( \frac{3}{4} \right)^2 \right] \right\}^2 + \frac{1}{4} = \\
 & = \left\{ \frac{15}{16} - \left[ \frac{5}{4} - \frac{9}{16} \right] \right\}^2 + \frac{1}{4} = \\
 & = \left\{ \frac{15}{16} - \left[ \frac{20-9}{16} \right] \right\}^2 + \frac{1}{4} = \\
 & = \left\{ \frac{15}{16} - \frac{11}{16} \right\}^2 + \frac{1}{4} = \\
 & = \left\{ \frac{4}{16} \right\}^2 + \frac{1}{4} = \\
 & = \left\{ \frac{1}{4} \right\}^2 + \frac{1}{4} = \\
 & = \frac{1}{16} + \frac{1}{4} = \\
 & = \frac{1+4}{16} = \frac{5}{16}
 \end{aligned}$$



$$\begin{aligned}
 & \left\{ 1 - \left[ 1 - \left( \frac{1}{6} + \frac{1}{3} \right) \right] \right\}^2 \cdot \left( \frac{1}{2} + \frac{3}{4} \right)^2 \cdot \left[ 2 - \frac{1}{3} \cdot \left( \frac{7}{10} + \frac{1}{2} \right) \right]^2 = \\
 & = \left\{ 1 - \left[ 1 - \left( \frac{1+2}{6} \right) \right] \right\}^2 \cdot \left( \frac{2+3}{4} \right)^2 \cdot \left[ 2 - \frac{1}{3} \cdot \left( \frac{7+5}{10} \right) \right]^2 = \\
 & = \left\{ 1 - \left[ 1 - \frac{3}{6} \right] \right\}^2 \cdot \left( \frac{5}{4} \right)^2 \cdot \left[ 2 - \frac{1}{3} \cdot \left( \frac{12}{10} \right) \right]^2 = \\
 & = \left\{ 1 - \left[ 1 - \frac{1}{2} \right] \right\}^2 \cdot \frac{25}{16} \cdot \left[ 2 - \frac{1}{3} \cdot \left( \frac{6}{5} \right) \right]^2 = \\
 & = \left\{ 1 - \frac{1}{2} \right\}^2 \cdot \frac{25}{16} \cdot \left[ 2 - \frac{2}{5} \right]^2 = \\
 & = \frac{1}{4} \cdot \frac{25}{16} \cdot \frac{64}{25} = 1
 \end{aligned}$$

$$\begin{aligned}
 & \left\{ \left[ \left( \frac{1}{2} + \frac{1}{3} \right)^2 : \left( 1 + \frac{1}{4} \right)^2 \right] + \left[ \left( \frac{4}{21} : \frac{8}{7} + \frac{12}{7} : \frac{3}{7} \right) : \left( 2 - \frac{7}{6} \right) \right] \right\} : \left( \frac{7}{3} \right)^2 = \\
 & = \left\{ \left[ \left( \frac{3+2}{6} \right)^2 : \left( \frac{4+1}{4} \right)^2 \right] + \left[ \left( \frac{4}{21} \cdot \frac{7}{8} + \frac{12}{7} \cdot \frac{7}{3} \right) : \left( \frac{12-7}{6} \right) \right] \right\} : \frac{49}{9} = \\
 & = \left\{ \left[ \left( \frac{5}{6} \right)^2 : \left( \frac{5}{4} \right)^2 \right] + \left[ \left( \frac{1}{6} + 4 \right) : \frac{5}{6} \right] \right\} \cdot \frac{9}{49} = \\
 & = \left\{ \left[ \frac{25}{36} \cdot \frac{16}{25} \right] + \left[ \left( \frac{1+24}{6} \right) \cdot \frac{6}{5} \right] \right\} \cdot \frac{9}{49} = \\
 & = \left\{ \frac{4}{9} + \left[ \frac{25}{6} \cdot \frac{6}{5} \right] \right\} \cdot \frac{9}{49} = \\
 & = \left\{ \frac{4}{9} + 5 \right\} \cdot \frac{9}{49} = \\
 & = \left\{ \frac{4+45}{9} \right\} \cdot \frac{9}{49} = \\
 & = \frac{49}{9} \cdot \frac{9}{49} = 1
 \end{aligned}$$

$$\begin{aligned}
 & \left[ \frac{1}{3} - \left( \frac{3}{5} - \frac{1}{10} \right)^2 \right] \cdot \frac{3}{5} \div \frac{1}{2} + \frac{7}{4} \div \frac{5}{2} - \frac{2^2}{5} = \\
 & = \left[ \frac{1}{3} - \frac{1}{4} \right] \cdot \frac{3}{5} \cdot \frac{2}{1} + \frac{7}{4} \cdot \frac{2}{5} - \frac{4}{5} = \\
 & = \frac{1}{12} \cdot \frac{3}{5} \cdot \frac{2}{1} + \frac{7}{10} - \frac{4}{5} = \\
 & = \frac{1}{10} + \frac{7}{10} - \frac{4}{5} = \\
 & = \frac{1+7-8}{10} = \frac{0}{10} = 0
 \end{aligned}$$


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$$\begin{aligned}
 & \frac{10}{23} \cdot \left[ \left( \frac{2}{7} \div 7 + \frac{5}{49} \right)^2 \div \frac{1}{7} - \left( \frac{1}{2} - \frac{1}{3} \right)^2 \div \frac{5}{6} \right] = \\
 & = \frac{10}{23} \cdot \left[ \left( \frac{2}{49} + \frac{5}{49} \right)^2 \div \frac{1}{7} - \left( \frac{1}{6} \right)^2 \div \frac{5}{6} \right] = \\
 & = \frac{10}{23} \cdot \left[ \left( \frac{1}{7} \right)^2 \div \frac{1}{7} - \frac{1}{36} \cdot \frac{6}{5} \right] = \\
 & = \frac{10}{23} \cdot \left[ \frac{1}{7} - \frac{1}{30} \right] = \\
 & = \frac{10}{23} \cdot \frac{23}{210} = \frac{1}{21}
 \end{aligned}$$

$$\begin{aligned}
 & \left[ \left( \frac{5}{8} - \frac{1}{8} \right)^4 - \left( \frac{2}{11} \cdot \frac{22}{3} - 1 \right)^4 \right] : \left( \frac{1}{4} + \frac{1}{9} \right) \cdot \frac{6}{5} = \\
 & = \left[ \left( \frac{4}{8} \right)^4 - \left( \frac{4}{3} - 1 \right)^4 \right] : \left( \frac{9+4}{36} \right) \cdot \frac{6}{5} = \\
 & = \left[ \left( \frac{1}{2} \right)^4 - \left( \frac{1}{3} \right)^4 \right] : \frac{13}{36} \cdot \frac{6}{5} = \\
 & = \left[ \frac{1}{16} - \frac{1}{81} \right] \cdot \frac{36}{13} \cdot \frac{6}{5} = \\
 & = \left[ \frac{81-16}{1296} \right] \cdot \frac{36}{13} \cdot \frac{6}{5} = \\
 & = \frac{65}{1296} \cdot \frac{36}{13} \cdot \frac{6}{5} = \\
 & = \frac{65}{36} \cdot \frac{1}{13} \cdot \frac{6}{5} = \\
 & = \frac{13}{36} \cdot \frac{1}{13} \cdot \frac{6}{1} = \frac{1}{6}
 \end{aligned}$$

$$\begin{aligned}
 & \left[ \left( \frac{7}{13} \cdot \frac{26}{21} \right)^3 - \left( \frac{7}{5} \cdot \frac{14}{5} \right)^3 \right] : \left[ \left( \frac{2}{3} \right)^2 + \frac{2}{3} : 2 + \frac{1}{4} \right] = \\
 & = \left[ \left( \frac{2}{3} \right)^3 - \left( \frac{1}{2} \right)^3 \right] : \left[ \frac{4}{9} + \frac{1}{3} + \frac{1}{4} \right] = \\
 & = \left[ \frac{8}{27} - \frac{1}{8} \right] : \left[ \frac{16+12+9}{36} \right] = \\
 & = \left[ \frac{64-27}{216} \right] : \frac{37}{36} = \\
 & = \frac{37}{216} \cdot \frac{36}{37} = \frac{1}{6}
 \end{aligned}$$


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$$\begin{aligned}
 & \left[ \left( \frac{1}{2} + \frac{3}{4} - 1 \right)^2 : \frac{3}{16} + \frac{3}{2} + \left( \frac{1}{4} - \frac{1}{5} \right) \cdot \left( \frac{15}{3} \cdot 2^2 \right) \right] : \frac{1}{3} = \\
 & = \left[ \left( \frac{2+3-4}{4} \right)^2 \cdot \frac{16}{3} + \frac{3}{2} + \left( \frac{5-4}{20} \right) \cdot (5 \cdot 4) \right] \cdot 3 = \\
 & = \left[ \left( \frac{1}{4} \right)^2 \cdot \frac{16}{3} + \frac{3}{2} + \frac{1}{20} \cdot 20 \right] \cdot 3 = \\
 & = \left[ \frac{1}{16} \cdot \frac{16}{3} + \frac{3}{2} + 1 \right] \cdot 3 = \\
 & = \left[ \frac{1}{3} + \frac{3}{2} + 1 \right] \cdot 3 = \\
 & = \left[ \frac{2+9+6}{6} \right] \cdot 3 = \\
 & = \frac{17}{6} \cdot 3 = \frac{17}{2}
 \end{aligned}$$

$$\begin{aligned}
 & \left(1 - \frac{3}{7}\right) \cdot \left[ \frac{2}{29} \cdot \left(\frac{11}{5} - \frac{3}{4}\right) + \left(\frac{3}{20} + \frac{4}{15} - \frac{3}{8}\right)^2 : \left(\frac{1}{3} - \frac{1}{4}\right)^2 \right] : \left(\frac{4}{5}\right)^2 + \left(1 - \frac{1}{2}\right)^2 = \\
 & = \frac{4}{7} \cdot \left[ \frac{2}{29} \cdot \left(\frac{44-15}{20}\right) + \left(\frac{18+32-45}{120}\right)^2 : \left(\frac{4-3}{12}\right)^2 \right] : \frac{16}{25} + \left(\frac{1}{2}\right)^2 = \\
 & = \frac{4}{7} \cdot \left[ \frac{2}{29} \cdot \frac{29}{20} + \left(\frac{5}{120}\right)^2 : \left(\frac{1}{12}\right)^2 \right] : \frac{16}{25} + \frac{1}{4} = \\
 & = \frac{4}{7} \cdot \left[ \frac{1}{10} + \left(\frac{1}{24}\right)^2 : \left(\frac{1}{12}\right)^2 \right] : \frac{16}{25} + \frac{1}{4} = \\
 & = \frac{4}{7} \cdot \left[ \frac{1}{10} + \left(\frac{1}{24} \cdot \frac{12}{1}\right)^2 \right] : \frac{16}{25} + \frac{1}{4} = \\
 & = \frac{4}{7} \cdot \left[ \frac{1}{10} + \left(\frac{1}{2}\right)^2 \right] : \frac{16}{25} + \frac{1}{4} = \\
 & = \frac{4}{7} \cdot \left[ \frac{1}{10} + \frac{1}{4} \right] : \frac{16}{25} + \frac{1}{4} = \\
 & = \frac{4}{7} \cdot \left[ \frac{2+5}{20} \right] \cdot \frac{25}{16} + \frac{1}{4} = \\
 & = \frac{4}{7} \cdot \frac{7}{20} \cdot \frac{25}{16} + \frac{1}{4} = \\
 & = \frac{1}{5} \cdot \frac{25}{16} + \frac{1}{4} = \\
 & = \frac{5}{16} + \frac{1}{4} = \\
 & = \frac{5+4}{16} = \frac{9}{16}
 \end{aligned}$$

$$\begin{aligned}
 & \left[ \left( 2 + \frac{2}{3} \right) - \left( \frac{1}{3} + \frac{3}{4} - \frac{5}{6} \right) : \left( 1 + \frac{1}{2} \right)^2 \right] : \left[ \left( 1 - \frac{2}{5} \right)^2 \cdot \left( \frac{5}{3} \right)^2 + \frac{7}{2} \cdot \left( \frac{1}{3} \right)^2 \right] = \\
 & = \left[ \frac{8}{3} - \left( \frac{4 + 9 - 10}{12} \right) : \left( \frac{3}{2} \right)^2 \right] : \left[ \left( \frac{3}{5} \right)^2 \cdot \frac{25}{9} + \frac{7}{2} \cdot \frac{1}{9} \right] = \\
 & = \left[ \frac{8}{3} - \left( \frac{3^1}{12_4} \right) : \frac{9}{4} \right] : \left[ \frac{9^1}{25_1} \cdot \frac{25^1}{9_1} + \frac{7}{18} \right] = \\
 & = \left[ \frac{8}{3} - \frac{1}{4} \cdot \frac{4}{9} \right] : \left[ 1 + \frac{7}{18} \right] = \\
 & = \left[ \frac{8}{3} - \frac{1}{9} \right] : \left[ \frac{25}{18} \right] = \\
 & = \left[ \frac{24 - 1}{9} \right] \cdot \frac{18}{25} = \\
 & = \frac{23}{9_1} \cdot \frac{18^2}{25} = \frac{46}{25}
 \end{aligned}$$

$$\begin{aligned}
 & \left[ \left( \frac{1}{3} \right)^2 : \left( \frac{1}{6} \right)^2 \right] \cdot \left[ \left( \frac{1}{2} \right)^4 : \left( \frac{1}{15} : \frac{4}{15} \right) \right] : \left[ \left( \frac{3}{2} \right)^2 - \left( 1 - \frac{1}{2} \right) \right] = \\
 & = \left[ \left( \frac{1}{3} : \frac{1}{6} \right)^2 \right] \cdot \left[ \left( \frac{1}{2} \right)^4 : \left( \frac{1}{15} \cdot \frac{15}{4} \right) \right] : \left[ \left( \frac{3}{2} \right)^2 - \left( \frac{2-1}{2} \right) \right] = \\
 & = \left[ \left( \frac{1 \cdot 6}{3 \cdot 1} \right)^2 \right] \cdot \left[ \frac{1}{16} : \frac{1}{4} \right] : \left[ \frac{9}{4} - \frac{1}{2} \right] = \\
 & = 4 \cdot \frac{1}{4} : \frac{7}{4} = \\
 & = 1 \cdot \frac{4}{7} = \frac{4}{7}
 \end{aligned}$$

$$\begin{aligned}
 & \left\{ \left[ \left( \frac{1}{6} + \frac{1}{4} \right)^2 : \left( 2 - \frac{1}{3} \right) + \frac{5}{12} - \frac{1}{2} \right] : \left( \frac{1}{4} \right)^2 - \frac{1}{3} \right\}^2 + \frac{1}{4} = \\
 & = \left\{ \left[ \left( \frac{2+3}{12} \right)^2 : \left( \frac{6-1}{3} \right) + \frac{5}{12} - \frac{1}{2} \right] : \frac{1}{16} - \frac{1}{3} \right\}^2 + \frac{1}{4} = \\
 & = \left\{ \left[ \left( \frac{5}{12} \right)^2 : \frac{5}{3} + \frac{5}{12} - \frac{1}{2} \right] \cdot 16 - \frac{1}{3} \right\}^2 + \frac{1}{4} = \\
 & = \left\{ \left[ \frac{25}{144} \cdot \frac{3}{5} + \frac{5}{12} - \frac{1}{2} \right] \cdot 16 - \frac{1}{3} \right\}^2 + \frac{1}{4} = \\
 & = \left\{ \left[ \frac{5}{48} + \frac{5}{12} - \frac{1}{2} \right] \cdot 16 - \frac{1}{3} \right\}^2 + \frac{1}{4} = \\
 & = \left\{ \left[ \frac{5+20-24}{48} \right] \cdot 16 - \frac{1}{3} \right\}^2 + \frac{1}{4} = \\
 & = \left\{ \frac{1}{48} \cdot 16 - \frac{1}{3} \right\}^2 + \frac{1}{4} = \\
 & = \left\{ \frac{1}{3} - \frac{1}{3} \right\}^2 + \frac{1}{4} = \frac{1}{4}
 \end{aligned}$$



$$\begin{aligned}
 & \left[ \left(1 - \frac{2}{7}\right) \cdot \left(\frac{2}{7} + \frac{19}{7}\right) : \left(1 - \frac{4}{7}\right) + \left(3 - \frac{4}{3}\right)^2 + \left(2 - \frac{1}{2}\right)^2 \right] : \left(3 + \frac{1}{6}\right)^2 + \left(5 - \frac{7}{2}\right)^2 - \left(7 - \frac{13}{2}\right)^2 = \\
 & = \left[ \frac{5}{7} \cdot \frac{21}{7} : \frac{3}{7} + \left(\frac{5}{3}\right)^2 + \left(\frac{3}{2}\right)^2 \right] : \left(\frac{19}{6}\right)^2 + \left(\frac{3}{2}\right)^2 - \left(\frac{1}{2}\right)^2 = \\
 & = \left[ \frac{5}{7} \cdot \frac{21}{7} \cdot \frac{7}{3} + \frac{25}{9} + \frac{9}{4} \right] : \left(\frac{19}{6}\right)^2 + \frac{9}{4} - \frac{1}{4} = \\
 & = \left[ 5 + \frac{25}{9} + \frac{9}{4} \right] : \left(\frac{19}{6}\right)^2 + \frac{9}{4} - \frac{1}{4} = \\
 & = \left[ \frac{180 + 100 + 81}{36} \right] : \left(\frac{19}{6}\right)^2 + \frac{9}{4} - \frac{1}{4} = \\
 & = \frac{361}{36} : \left(\frac{19}{6}\right)^2 + \frac{9}{4} - \frac{1}{4} = \\
 & = \frac{361}{36} : \frac{361}{36} + \frac{9}{4} - \frac{1}{4} = \\
 & = 1 + \frac{8}{4} = 1 + 2 = 3
 \end{aligned}$$

$$\begin{aligned}
 & \left\{ \frac{2}{3} - \left[ \left(\frac{1}{2^3} + \frac{1}{2^2}\right) \cdot \frac{2}{3} \right] \right\} : \left[ 3 + \left(\frac{1}{3}\right)^4 : \left(\frac{1}{3}\right)^3 \right] + \left[ \left(\frac{1}{3}\right)^0 + \left(\frac{1}{3}\right)^5 : \left(\frac{1}{3}\right)^4 \right] \cdot \left(\frac{1}{2}\right)^3 \\
 & = \left\{ \frac{2}{3} - \left[ \left(\frac{1}{8} + \frac{1}{8}\right) \cdot \frac{2}{3} \right] \right\} : \left[ 3 + \frac{1}{3} \right] + \left[ 1 + \frac{1}{3} \right] \cdot \frac{1}{8} = \\
 & = \left\{ \frac{2}{3} - \left[ \left(\frac{1+2}{8}\right) \cdot \frac{2}{3} \right] \right\} : \left(\frac{9+1}{3}\right) + \left(\frac{3+1}{3}\right) \cdot \frac{1}{8} = \\
 & = \left\{ \frac{2}{3} - \left[ \frac{3}{8} \cdot \frac{2}{3} \right] \right\} : \frac{10}{3} + \frac{4}{3} \cdot \frac{1}{8} = \\
 & = \left\{ \frac{2}{3} - \frac{1}{4} \right\} \cdot \frac{3}{10} + \frac{1}{6} = \\
 & = \left[ \frac{8-3}{12} \right] \cdot \frac{3}{10} + \frac{1}{6} = \\
 & = \left[ \frac{5}{12} \right] \cdot \frac{3}{10} + \frac{1}{6} = \\
 & = \frac{1}{8} + \frac{1}{6} = \frac{3+4}{24} = \frac{7}{24}
 \end{aligned}$$

$$\begin{aligned}
 & \left(3 - \frac{10}{7}\right) : \left[\left(1 + \frac{1}{2}\right) - \left(1 - \frac{1}{3}\right)^2 \cdot \left(\frac{3}{20} + \frac{6}{35}\right)\right] : \left[\frac{11}{3} - \left(1 - \frac{1}{3}\right)\right] = \\
 & = \left(\frac{21 - 10}{7}\right) : \left[\left(\frac{2 + 1}{2}\right) - \left(\frac{3 - 1}{3}\right)^2 \cdot \left(\frac{21 + 24}{140}\right)\right] : \left[\frac{11}{3} - \left(\frac{3 - 1}{3}\right)\right] = \\
 & = \frac{11}{7} : \left[\frac{3}{2} - \left(\frac{2}{3}\right)^2 \cdot \left(\frac{45}{140}\right)\right] : \left[\frac{11}{3} - \frac{2}{3}\right] = \\
 & = \frac{11}{7} : \left[\frac{3}{2} - \frac{4}{9} \cdot \frac{9}{28}\right] : \left[\frac{11 - 2}{3}\right] = \\
 & = \frac{11}{7} : \left[\frac{3}{2} - \frac{1}{7}\right] : \left[\frac{9}{3}\right] = \\
 & = \frac{11}{7} : \left[\frac{14 - 3}{14}\right] : 3 = \\
 & = \frac{11}{7} \cdot \frac{14}{11} \cdot \frac{1}{3} = \\
 & = \frac{11}{7} \cdot \frac{14}{11} \cdot \frac{1}{3} = \frac{2}{3}
 \end{aligned}$$

$$\begin{aligned}
 & \left[\frac{5^2}{90} \cdot \left(\frac{2}{5}\right)^3 : \left(\frac{2}{5}\right)^2 + \frac{1}{2} \cdot \left(\frac{1}{3}\right)^4 : \left(\frac{1}{3}\right)^3\right] : \left[\left(1 + \frac{2}{3} - \frac{11}{3^2}\right)^2 : \frac{4}{9}\right] = \\
 & = \left[\frac{25}{90} \cdot \frac{2}{5} + \frac{1}{2} \cdot \frac{1}{3}\right] : \left[\left(\frac{9 + 6 - 11}{9}\right)^2 : \frac{4}{9}\right] = \\
 & = \left[\frac{5}{45} + \frac{1}{6}\right] : \left[\left(\frac{4}{9}\right)^{2-1}\right] = \\
 & = \left[\frac{1}{9} + \frac{1}{6}\right] \cdot \frac{9}{4} = \\
 & = \frac{2 + 3}{18} \cdot \frac{9}{4} = \\
 & = \frac{5}{18} \cdot \frac{9}{4} = \\
 & = \frac{5}{2} \cdot \frac{1}{4} = \frac{5}{8}
 \end{aligned}$$

$$\begin{aligned}
 & \left[ \left(\frac{1}{3}\right)^3 : \left(\frac{1}{3}\right)^2 \cdot \left(\frac{1}{3} + \frac{1}{2}\right) : 5 + \left(\frac{1}{9}\right)^4 : \left(\frac{1}{9}\right)^3 \right] \cdot \frac{1}{3} + \frac{5}{6} - \left(1 - \frac{2}{3}\right)^2 = \\
 & = \left[ \left(\frac{1}{3}\right)^{3-2} \cdot \left(\frac{2+3}{6}\right) \cdot \frac{1}{5} + \left(\frac{1}{9}\right)^{4-3} \right] \cdot \frac{1}{3} + \frac{5}{6} - \left(\frac{3-2}{3}\right)^2 = \\
 & = \left[ \frac{1}{3} \cdot \frac{5}{6} \cdot \frac{1}{3} + \frac{1}{9} \right] \cdot \frac{1}{3} + \frac{5}{6} - \left(\frac{1}{3}\right)^2 = \\
 & = \left[ \frac{1}{18} + \frac{1}{9} \right] \cdot \frac{1}{3} + \frac{5}{6} - \frac{1}{9} = \\
 & = \left[ \frac{1+2}{18} \right] \cdot \frac{1}{3} + \frac{5}{6} - \frac{1}{9} = \\
 & = \frac{3}{18} \cdot \frac{1}{3} + \frac{5}{6} - \frac{1}{9} = \\
 & = \frac{1}{18} + \frac{5}{6} - \frac{1}{9} = \\
 & = \frac{1+15-2}{18} = \frac{14}{18} = \frac{7}{9}
 \end{aligned}$$

$$\begin{aligned}
 & \left[ \left(\frac{1}{2}\right)^2 : \left(\frac{1}{2}\right)^3 \right] \cdot \left[ \frac{3}{2} - \left(\frac{4}{9}\right)^2 : \left(1 - \frac{5}{9}\right)^2 \right] = \\
 & = \left[ \frac{1}{4} : \frac{1}{8} \right] \cdot \left[ \frac{3}{2} - \frac{16}{81} : \left(\frac{9-5}{9}\right)^2 \right] = \\
 & = \left[ \frac{1}{4} \cdot \frac{8}{1} \right] \cdot \left[ \frac{3}{2} - \frac{16}{81} : \left(\frac{4}{9}\right)^2 \right] = \\
 & = 2 \cdot \left[ \frac{3}{2} - \frac{16}{81} : \frac{16}{81} \right] = \\
 & = 2 \cdot \left[ \frac{3}{2} - \frac{16}{81} \cdot \frac{81}{16} \right] = \\
 & = 2 \cdot \left[ \frac{3}{2} - 1 \right] = \\
 & = 2 \cdot \left[ \frac{3-2}{2} \right] = \\
 & = 2 \cdot \frac{1}{2} = 1
 \end{aligned}$$

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






$$\begin{aligned}
 & \left( \frac{1}{4} \right)^2 : \left( \frac{1}{4} \right)^2 + \left( \frac{1}{2} \right)^2 + \frac{4}{3} - \left( \frac{4}{3} \right)^3 : \left( \frac{4}{3} \right)^2 - \left( \frac{1}{2} \right)^1 = \\
 & = \left( \frac{1}{4} \right)^{2-2} + \frac{1}{4} + \frac{4}{3} - \left( \frac{4}{3} \right)^{3-2} - \frac{1}{2} = \\
 & = \left( \frac{1}{4} \right)^0 + \frac{1}{4} + \frac{4}{3} - \frac{4}{3} - \frac{1}{2} = \\
 & = 1 + \frac{1}{4} - \frac{1}{2} = \\
 & = \frac{4}{4} + \frac{1}{4} - \frac{2}{4} = \\
 & = \frac{4+1-2}{4} = \frac{3}{4}
 \end{aligned}$$

$$\begin{aligned}
 & \left(\frac{1}{2}\right)^0 + \left[\left(\frac{3}{2} - \frac{1}{4}\right)^2 - \left(1 - \frac{1}{4}\right)^2\right] : \left(\frac{3}{2}\right)^2 - \left(\frac{1}{2}\right)^1 = \\
 & = 1 + \left[\left(\frac{5}{4}\right)^2 - \left(\frac{3}{4}\right)^2\right] \cdot \frac{4}{9} - \frac{1}{2} = \\
 & = 1 + \left[\frac{25}{16} - \frac{9}{16}\right] \cdot \frac{4}{9} - \frac{1}{2} = \\
 & = 1 + \left[\frac{16}{16}\right] \cdot \frac{4}{9} - \frac{1}{2} = \\
 & = 1 + \frac{4}{9} - \frac{1}{2} = \\
 & = \frac{18 + 8 - 9}{18} = \frac{17}{18}
 \end{aligned}$$


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$$\begin{aligned}
 & \left(\frac{2}{3} + \frac{2}{6}\right)^1 + \left[\left(\frac{3}{5} - \frac{1}{10}\right)^2 : \left(1 - \frac{1}{3}\right)^2\right] - \left(\frac{1}{2} + \frac{2}{3}\right)^0 - \left(\frac{5}{16}\right)^5 : \left(\frac{5}{16}\right)^4 = \\
 & = \left(\frac{2}{3} + \frac{1}{3}\right)^1 + \left[\left(\frac{6-1}{10}\right)^2 : \left(\frac{3-1}{3}\right)^2\right] - 1 - \left(\frac{5}{16}\right)^{5-4} = \\
 & = \frac{3}{3} + \left[\left(\frac{5^1}{10_2}\right)^2 : \left(\frac{2}{3}\right)^2\right] - 1 - \left(\frac{5}{16}\right)^1 = \\
 & = 1 + \left[\frac{1}{4} \cdot \frac{9}{4}\right] - 1 - \frac{5}{16} = \\
 & = 1 + \frac{9}{16} - 1 - \frac{5}{16} = \\
 & = \frac{9}{16} - \frac{5}{16} = \\
 & = \frac{4}{16} = \frac{1}{4}
 \end{aligned}$$

## Keywords

 *Matematica, Aritmetica, Frazioni, Espressioni Q, addizione, sottrazione, moltiplicazione, divisione, esercizi con soluzioni*  
 *Math, Arithmetic, Fraction expressions, Fraction, Expression, Addition, Subtraction, Multiplication, Division, Fraction expressions solved*  
 *Matemática, Aritmética, Fracción, Expresiones, Resta, Sustracción, Suma, Adición, Multiplicación, División*  
 *Mathématique, Arithmétique, Fraction, Problèmes avec fractions, Addition, Soustraction, Multiplication, Division*  
 *Mathematik, Arithmetik, Bruchrechnung, Bruch, Subtraktion, Addition, Multiplikation, Division*

Arabic: كَسْر

Chinese (Simplified): 分数

Chinese (Traditional): 分數

Czech: zlomek

Danish: brøkdel

Dutch: deel, breuk

Estonian: murd(arv)

Finnish: murtoluku

French: fraction

Greek: κλάσμα

Hungarian: hányad, tört(rész)

Icelandic: brot

Indonesian: pecahan

Japanese: 分数

Korean: 분수

Lithuanian: trupmena

Norwegian: brøk(del)

Polish: ułamek

Portuguese (Brazil): fração

Portuguese (Portugal): fracção

Romanian: fracție

Russian: дробь

Slovak: zlomek

Slovenian: ulomek

Swedish: del

Turkish: kesir