



Numeri relativi – Espressioni con le potenze ed esponente negativo

Signed Numbers

- =====
- $(2^{-2})^4 \cdot (2^{-2})^{-4} =$ [1]
 - $(3^{-2} \cdot 3^{-5} \cdot 3^{-3}) : (3^3 \cdot 3)^{-2} =$ $\left[\frac{1}{9}\right]$
 - $[(-5)^{-2}]^5 : (-5)^{-5} \cdot [(-5)^{-4}]^2 : [(-5)^{-4}]^3 =$ $\left[-\frac{1}{5}\right]$
 - $[(-2)^{-2}]^3 \div (-2)^{-5} \cdot [(-2)^4]^2 =$ [-8]
 - $2^2 : 2^{-6} \cdot 2^5 + 2 : 2^{-6} : (2^6 \cdot 2^2) + 2^9 \cdot 2^{-10} =$ [5]
 - $-\left(\frac{3}{2}\right)^{-2} - \left[\left(\frac{1}{2}\right)^{-1} - 5\right]^{-2} : \left(\frac{1}{3}\right)^{-1} =$ $\left[-\frac{13}{27}\right]$
 - $\left(3 - \frac{10}{7}\right) \cdot \left[\left(\frac{3}{2}\right)^{-1} - \left(2 - \frac{1}{2}\right)^{-2} \cdot \left(\frac{3}{20} + \frac{6}{35}\right)\right]^{-1} : \left(\frac{1}{3}\right)^{-1} =$ [1]
 - $\left[\left(1 + \frac{1}{2}\right) \cdot \left(\frac{3}{2}\right)^{-1} - \left(2 - \frac{1}{3}\right) \cdot \left(-\frac{5}{3}\right)^{-2} \cdot (3)^{-1}\right] \cdot \frac{4}{5} =$ $\left[\frac{16}{25}\right]$
 - $\left\{1 - \left[1 - \left(\frac{1}{3} + \frac{1}{6}\right)\right]\right\}^{-2} \cdot \left[2 - \left(\frac{1}{2} + \frac{7}{10}\right) \div 3\right]^{-2} \cdot \left(-\frac{3}{4} + \frac{1}{2}\right)^{-2} =$ [25]
 - $\left[\left(\frac{1}{2}\right)^6 \div \left(\frac{1}{2}\right)^4\right]^{-2} \div \left[\left(\frac{1}{2}\right)^{-2} \cdot \left(\frac{1}{2}\right)^{-2}\right] =$ [1]
 - $\left(-\frac{3}{2}\right)^{-2} : \left\{\left[\left(-\frac{1}{2}\right)^2 + (3)^{-1} \cdot (2)^{-1}\right] : \left(-\frac{1}{2}\right) + \left(\frac{1}{2}\right)^2 : \left(-\frac{14}{3}\right)^{-1}\right\} =$ $\left[-\frac{2}{9}\right]$
 - $\left[\left(-\frac{2}{3}\right)^{-3}\right]^2 : \left(-\frac{2}{3}\right)^2 \cdot \left(-\frac{2}{3}\right)^7 \cdot \left(-\frac{2}{3}\right)^2 =$ $\left[-\frac{2}{3}\right]$
 - $\left[\left(-\frac{8}{3}\right)^2\right]^{-3} \div \left(-\frac{8}{3}\right)^2 \cdot \left(-\frac{8}{3}\right)^8 \cdot \left(-\frac{8}{3}\right)^{-2} =$ $\left[\frac{9}{64}\right]$



14. $\left[\left(-\frac{7}{4} \right)^{-3} \right]^2 \div \left(-\frac{7}{4} \right)^2 \cdot \left(-\frac{7}{4} \right)^8 \cdot \left(-\frac{7}{4} \right)^{-2} =$ $\left[\frac{16}{49} \right]$
15. $\frac{2}{3} \cdot \left[\left(-1 + \frac{3}{4} \right) \div \left(-\frac{1}{4} \right) - \left(-\frac{1}{2} - 3 \right) \div \left(-\frac{1}{2} \right)^3 \right] \cdot \left(-\frac{1}{3} \right)^2 - 1 + \left(\frac{1}{3} \right)^{-1} =$ [0]
16. $\left\{ \left[\left(\frac{1}{5} \right)^2 \cdot \left(\frac{15}{2} \right)^2 \right]^{-1} \cdot \left[\left(\frac{9}{5} \right)^3 \cdot \left(\frac{6}{5} \right)^3 \right] \right\}^{-1} \cdot \left(\frac{2}{3} \right)^2 =$ $\left[\frac{8}{27} \right]$
17. $-\left(\frac{8}{3} \right)^{-1} \cdot \left[3^4 \cdot \left(-\frac{1}{3} \right)^{-4} + 3 \right] - (-2)^{-1} \cdot \frac{1}{2} =$ $\left[-\frac{5}{4} \right]$
18. $\left[\left(\frac{9}{4} \right)^6 \cdot \left(\frac{9}{4} \right)^4 \right]^{-1} \cdot \left[\left(\frac{2}{3} \right)^5 \cdot \left(\frac{2}{3} \right)^7 \right]^1 \cdot \left(-\frac{1}{2} \right)^0 =$ $\left[\frac{9}{4} \right]$
19. $\left[-\left(\frac{25}{49} \right)^2 \cdot \left(\frac{5}{7} \right)^2 \cdot \left(\frac{5}{7} \right)^3 \right] \cdot \left(\frac{15}{14} \right)^{-1} =$ $\left[-\frac{3}{2} \right]$
20. $\left[\left(\frac{1}{2} \right)^2 \cdot \left(\frac{1}{2} \right)^3 \right] \cdot \left[-\frac{3}{2} - \left(-\frac{9}{4} \right)^2 \cdot \left(1 + \frac{5}{4} \right)^{-2} \right]^{-1} =$ $\left[-\frac{4}{5} \right]$



Esercizi e soluzioni

$$(2^{-2})^4 \cdot (2^{-2})^{-4} =$$

$$= (2^{-2 \cdot 4}) \cdot (2^{-2 \cdot (-4)}) =$$

$$= 2^{-8} \cdot 2^8 = 2^{-8+8} = 2^0 = 1$$

$$(3^{-2} \cdot 3^{-5} \cdot 3^{-3}) : (3^3 \cdot 3)^{-2} =$$

$$= (3^{-2-5-3}) : (3^{3+1})^{-2} =$$

$$= (3^{-10}) : (3^4)^{-2} =$$

$$= (3^{-10}) : 3^{4 \cdot (-2)} =$$

$$= (3^{-10}) : 3^{-8} =$$

$$= 3^{-10-(-8)} =$$

$$= 3^{-10+8} = 3^{-2} = \left(\frac{1}{3}\right)^2 = \frac{1}{9}$$

$$[(-5)^{-2}]^5 : (-5)^{-5} \cdot [(-5)^{-4}]^2 : [(-5)^{-4}]^3 =$$

$$= (-5)^{-2 \cdot 5} \div (-5)^{-5} \cdot (-5)^{-4 \cdot 2} \div (-5)^{-4 \cdot 3} =$$

$$= (-5)^{-10} \div (-5)^{-5} \cdot (-5)^{-8} \div (-5)^{-12} =$$

$$= (-5)^{-10-(-5)+(-8)-(-12)} =$$

$$= (-5)^{-10+5-8+12} = (-5)^{-1} = -\frac{1}{5}$$

$$\left[(-2)^{-2}\right]^{-3} \div (-2)^{-5} \cdot \left[(-2)^4\right]^{-2} =$$

$$= (-2)^{-2 \cdot (-3)} \div (-2)^{-5} \cdot (-2)^{4 \cdot (-2)} =$$

$$= (-2)^{+6} \div (-2)^{-5} \cdot (-2)^{-8} =$$

$$= (-2)^{+6-(-5)+(-8)} =$$

$$= (-2)^{+6+5-8} =$$

$$= (-2)^{1-8} =$$

$$= (-2)^3 = -8$$



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

$$\begin{aligned} &-\left(\frac{3}{2}\right)^{-2} - \left[\left(\frac{1}{2}\right)^{-1} - 5\right]^{-2} : \left(\frac{1}{3}\right)^{-1} = \\ &= -\left(\frac{2}{3}\right)^2 - [2-5]^{-2} : 3 = \\ &= -\frac{4}{9} - [-3]^{-2} \cdot \frac{1}{3} = \\ &= -\frac{4}{9} - \left[-\frac{1}{3}\right]^2 \cdot \frac{1}{3} = \\ &= -\frac{4}{9} - \frac{1}{9} \cdot \frac{1}{3} = -\frac{4}{9} - \frac{1}{27} = \frac{-12-1}{27} = -\frac{13}{27} \end{aligned}$$

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



$$\begin{aligned} & \left[\left(1 + \frac{1}{2} \right) \cdot \left(\frac{3}{2} \right)^{-1} - \left(2 - \frac{1}{3} \right) \cdot \left(-\frac{5}{3} \right)^{-2} \cdot (3)^{-1} \right] \cdot \frac{4}{5} = \\ & = \left[\left(\frac{2+1}{2} \right) \cdot \left(\frac{2}{3} \right) - \left(\frac{6-1}{3} \right) \cdot \left(-\frac{3}{5} \right)^2 \cdot \left(\frac{1}{3} \right) \right] \cdot \frac{4}{5} = \\ & = \left[\left(\frac{3}{2} \right) \cdot \left(\frac{2}{3} \right) - \left(\frac{5}{3} \right) \cdot \left(\frac{9}{25} \right) \cdot \left(\frac{1}{3} \right) \right] \cdot \frac{4}{5} = \\ & = \left[1 - \frac{1}{5} \right] \cdot \frac{4}{5} = \\ & = \left[\frac{5-1}{5} \right] \cdot \frac{4}{5} = \\ & = \left[\frac{4}{5} \right] \cdot \frac{4}{5} = \frac{16}{25} \end{aligned}$$

$$\begin{aligned} & \left\{ 1 - \left[1 - \left(\frac{1}{3} + \frac{1}{6} \right) \right] \right\}^{-2} \cdot \left[2 - \left(\frac{1}{2} + \frac{7}{10} \right) \div 3 \right]^{-2} \cdot \left(-\frac{3}{4} + \frac{1}{2} \right)^{-2} = \\ & = \left\{ 1 - \left[1 - \frac{2+1}{6} \right] \right\}^{-2} \cdot \left[2 - \frac{5+7}{10} \div 3 \right]^{-2} \cdot \left(\frac{-3+2}{4} \right)^{-2} = \\ & = \left\{ 1 - \left[1 - \frac{3^1}{6_2} \right] \right\}^{-2} \cdot \left[2 - \frac{12}{10} \cdot \frac{1}{3} \right]^{-2} \cdot \left(-\frac{1}{4} \right)^{-2} = \\ & = \left\{ 1 - \left[1 - \frac{3^1}{6_2} \right] \right\}^{-2} \cdot \left[2 - \frac{2^4 12}{10_5} \cdot \frac{1}{3_1} \right]^{-2} \cdot (-4)^2 = \\ & = \left\{ 1 - \frac{1}{2} \right\}^{-2} \cdot \left[\frac{10-2}{5} \right]^{-2} \cdot 16 = \\ & = \left\{ \frac{1}{2} \right\}^{-2} \cdot \left[\frac{8}{5} \right]^{-2} \cdot 16 = \\ & = \left\{ \frac{2}{1} \right\}^2 \cdot \left[\frac{5}{8} \right]^2 \cdot 16 = \\ & = \frac{4}{1} \cdot \frac{25}{64^{16^1}} \cdot \frac{16_1}{1} = 25 \end{aligned}$$