

Calcolo del valore di un'espressione letterale. Livello intermedio.

Polynomials - Éléments du calcul littéral

1.	$\left(-\frac{4}{3}x^2\right)^2$	$x = -\frac{3}{4}$	9/16 soluzione
2.	$\frac{1}{2}a + 2b + a - b$	$a = -3; b = 2$	-5/2 soluzione
3.	$-\left(\frac{1}{2}a + 2b\right) - 2 \cdot (a - b)$	$a = 2; b = -3$	-5 soluzione
4.	$\frac{3x - 2y}{2x - y}$	$x = -\frac{2}{3}; y = \frac{3}{4}$	soluzione
5.	$\frac{\frac{x}{y^2} - \frac{x-1}{y(y+1)}}{\frac{x+y}{xy}}$	$x = \frac{5}{2}; y = -6$	soluzione
6.	$\frac{4x^2 - 3xy + 2xz}{5x + y}$	$1; y = 2; z = \frac{1}{2}$	soluzione
7.	$\frac{3 \cdot (2x - 5)}{4} - \frac{4 \cdot (x - 2)}{5} + \frac{-10x + 10}{10}$	$x = \frac{1}{8}$	soluzione
8.	$4x - \frac{x+3}{4} - \frac{5 \cdot (x+1)}{3} =$	$x = -1$	soluzione
9.	$\frac{3 \cdot (x - 2)}{2} - \frac{4 \cdot (x + 1)}{3}$	$x = -1$	soluzione
10.	$\left(-\frac{15}{2}x^3y^2z\right)^3$	$x = -1; y = \frac{1}{5}; z = -10$	soluzione
11.	$\frac{2a + b}{a + b}$	$a = -2; b = +2$	impossibile
12.	$\frac{a + b}{-c}$	$a = \frac{1}{2}; b = -\frac{1}{3}; c = -2$	soluzione
13.	$\frac{3 + (a + b)(a - b)}{(a + b) + 3}$	$a = -1; b = -2$	soluzione
14.	$(3 - a + b) - \left(2c - \frac{1}{2}a\right)$	$a = \frac{1}{2}; b = 2; c = 3$	soluzione

15.	$[(a)^{-3}]^2: a^2 \cdot a^7 \cdot a^{-2}$	$a = -\frac{2}{3}$	soluzione
16.	$-x^3 - x^2 - x - y^2 - y$	$x = -2; y = +3$	soluzione
17.	$\frac{1}{2a} + a - \frac{1}{2}b$	$a = -3; b = -8$	soluzione
18.	$\frac{1}{3}b - a^2 - \frac{1}{10}ab$	$a = -2; b = -4$	soluzione
19.	$-x^3 - \frac{1}{2}x^2y - \frac{1}{3}x - y$	$x = -\frac{1}{2}; y = \frac{1}{3}$	soluzione
20.	$\frac{(a+b)(a-b)}{a^2 - b^2}$	$a = 3; b = -3$	indeterminata
21.	$\frac{1}{3}x - 2y + \frac{2}{3}xy - y$	$x = -\frac{3}{2}; y = \frac{5}{6}$	soluzione
22.	$\frac{a^2 - (-b)}{1 + 2(a+b) - b}$	$a = -3; b = +5$ $a = 3; b = -5$	soluzione

23.

$$2x^3y^3 + 2 + xy^3 - 6x^2y^3 + 3 - xy^3 + 3x^2y^3 - 5 + 2x^2y^3 - 2x^3y^3$$

$$x = 1; y = -1$$

Soluzioni

$\left(-\frac{4}{3}x^2\right)^2 =$	$x = -\frac{3}{4}$
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$$\begin{aligned}
 &= \left[\left(-\frac{4}{3}\right) \left(-\frac{3}{4}\right)^2 \right]^2 = \\
 &= \left[\left(-\frac{4}{3}\right) \left(\frac{9}{16}\right) \right]^2 = \\
 &= \left(-\frac{3}{4}\right)^2 = \\
 &= \frac{9}{16}
 \end{aligned}$$

$\frac{1}{2}a + 2b + a - b =$	$a = -3; b = 2$
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$$\begin{aligned}
 &\frac{1}{2}(-3) + 2(2) + (-3) - 2 = \\
 &= -\frac{3}{2} + 4 - 3 - 2 = \\
 &= -\frac{3}{2} - 1 = \\
 &= \frac{-3 - 2}{2} = \\
 &= -\frac{5}{2}
 \end{aligned}$$

$$-\left(\frac{1}{2}a + 2b\right) - 2 \cdot (a - b) =$$

$$\text{per } a = 2 \text{ e } b = -3$$

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

$$= -(1 - 6) - 2 \cdot (2 + 3) =$$

$$= -(-5) - 2 \cdot (5) =$$

$$= +5 - 10 =$$

$$= -5$$

$\frac{3x - 2y}{2x - y}$	$x = -\frac{2}{3}; y = \frac{3}{4}$
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$$\frac{3 \cdot \left(-\frac{2}{3}\right) - 2 \cdot \frac{3}{4}}{2 \cdot \left(-\frac{2}{3}\right) - \frac{3}{4}} =$$

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

$$= \frac{\frac{-4 - 3}{2}}{\frac{-16 - 9}{12}} =$$

$$= -\frac{7}{2} \cdot \left(-\frac{12}{25}\right) =$$

$$= \frac{42}{25}$$

$$\frac{\frac{x}{y^2} - \frac{x-1}{y(y+1)}}{\frac{x+y}{xy}} \quad \text{per } x = \frac{5}{2} \text{ e } y = -6$$

$$= \frac{\frac{\frac{5}{2}}{(-6)^2} - \frac{\frac{5}{2} - 1}{(-6) \cdot (-6+1)}}{\frac{\frac{5}{2} + (-6)}{\frac{5}{2} \cdot (-6)}} =$$

$$= \frac{\frac{5}{2} \cdot \left(+\frac{1}{36}\right) - \frac{\frac{5}{2} - 1}{(-6) \cdot (-5)}}{\frac{\frac{5}{2} - 6}{-15}} =$$

$$= \frac{\frac{5}{72} - \frac{3}{2} \cdot \left(+\frac{1}{30}\right)}{-\frac{7}{2} \cdot \left(-\frac{1}{15}\right)} =$$

$$= \frac{\frac{5}{72} - \frac{1}{20}}{\frac{7}{30}} =$$

$$= \frac{25 - 18}{360} \cdot \frac{30}{7} =$$

$$= \frac{7}{36} \cdot \frac{3}{7} =$$

$$= \frac{3}{36} = \frac{1}{12}$$

$$\frac{4x^2 - 3xy + 2xz}{5x + y} \quad \text{per } x = -1 ; y = 2 \text{ e } z = \frac{1}{2}$$

$$= \frac{4 \cdot (-1)^2 - 3 \cdot (-1) \cdot (+2) + 2 \cdot (-1) \cdot \left(\frac{1}{2}\right)}{5 \cdot (-1) + 2} =$$

$$= \frac{4 + 3 \cdot (+2) - 2 \cdot \left(\frac{1}{2}\right)}{-5 + 2} =$$

$$= \frac{4 + 6 - 1}{-3} =$$

$$= \frac{+9}{-3} = -\frac{9}{3} = -3$$

$$\frac{3 \cdot (2x - 5)}{4} - \frac{4 \cdot (x - 2)}{5} + \frac{-10x + 10}{10} = \quad \text{per} \quad x = \frac{1}{8}$$

$$= \frac{3 \cdot \left(2\frac{1}{8} - 5\right)}{4} - \frac{4 \cdot \left(\frac{1}{8} - 2\right)}{5} + \frac{-10\frac{1}{8} + 10}{10} =$$

$$= \frac{3 \cdot \left(\frac{1}{4} - 5\right)}{4} - \frac{4 \cdot \left(\frac{1}{8} - 2\right)}{5} + \frac{-\frac{10}{8} + 10}{10} =$$

$$= \frac{3 \cdot \left(\frac{1 - 20}{4}\right)}{4} - \frac{4 \cdot \left(\frac{1 - 16}{8}\right)}{5} + \frac{-\frac{10}{8} + \frac{80}{8}}{10} =$$

$$= \frac{3 \cdot \left(-\frac{19}{4}\right)}{4} - \frac{4 \cdot \left(-\frac{15}{8}\right)}{5} + \frac{\frac{70}{8}}{10} =$$

$$= -\frac{57}{4} \cdot \left(\frac{1}{4}\right) - \left(-\frac{15}{2}\right) \cdot \left(\frac{1}{5}\right) + \frac{70}{8} \cdot \left(\frac{1}{10}\right) =$$

$$= -\frac{57}{16} + \frac{3}{2} + \frac{7}{4} =$$

$$= \frac{-57 + 24 + 14}{16} = -\frac{19}{16}$$

$$\begin{aligned}4x - \frac{x+3}{4} - \frac{5 \cdot (x+1)}{3} &= \\= 4 \cdot (-1) - \frac{-1+3}{4} - \frac{5 \cdot (-1+1)}{3} &= \\= -4 - \frac{2^1}{4_2} &= \qquad x = -1 \\= \frac{-8-1}{2} &= \\= -\frac{9}{2}\end{aligned}$$

$$\begin{aligned}\frac{3 \cdot (x-2)}{2} - \frac{4 \cdot (x+1)}{3} &= \qquad \text{per } x = -1 \\= \frac{3 \cdot (-1-2)}{2} - \frac{4 \cdot (-1+1)}{3} &= \\= \frac{3 \cdot (-3)}{2} &= \\= -\frac{9}{2}\end{aligned}$$

$\left(-\frac{15}{2}x^3y^2z\right)^3 =$	$x = -1; y = \frac{1}{5}; z = -10$
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$$\begin{aligned}& \left(-\frac{15}{2} \cdot (-1)^3 \cdot \left(\frac{1}{5}\right)^2 \cdot (-10)\right)^3 = \\& = \left(-\frac{15}{2} \cdot (-1) \cdot \left(\frac{1}{25}\right) \cdot (-10)\right)^3 = \\& = \left(-\frac{3}{1} \cdot (-1) \cdot \left(\frac{1}{5}\right) \cdot (-5)\right)^3 = \\& = (-3)^3 = \\& = -27\end{aligned}$$

$\frac{2a+b}{a+b} =$	$a = -2; b = +2$
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$$\begin{aligned}\frac{2 \cdot (-2) + 2}{-2 + 2} &= \frac{-4 + 2}{0} = \\&= -\frac{2}{0}\end{aligned}$$

Impossibile.

Qualsiasi numero per zero non può restituire se non zero.

$\frac{a+b}{-c} =$	$a = \frac{1}{2}; b = -\frac{1}{3}; c = -2$
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$$\begin{aligned} & \frac{\frac{1}{2} + \left(-\frac{1}{3}\right)}{-(-2)} = \\ & = \left(\frac{1}{2} - \frac{1}{3}\right) : 2 = \\ & = \frac{3-2}{6} \cdot \frac{1}{2} = \\ & = \frac{1}{6} \cdot \frac{1}{2} = \frac{1}{12} \end{aligned}$$

$\frac{3 + (a+b)(a-b)}{(a+b) + 3} =$	$a = -1; b = -2$
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$$\begin{aligned} & \frac{3 + (-1-2)(-1+2)}{(-1-2) + 3} = \\ & = \frac{3 + (-3)(1)}{-3 + 3} = \\ & = \frac{0}{0} \end{aligned}$$

Indeterminata

Tutti i numeri moltiplicati per zero danno come risultato zero.

$= (3 - a + b) - \left(2c - \frac{1}{2}a\right)$	$a = \frac{1}{2}; b = 2; c = 3$
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$$\begin{aligned}
 &= \left(3 - \frac{1}{2} + 2\right) - \left(2 \cdot 3 - \frac{1}{2} \cdot \frac{1}{2}\right) = \\
 &= \left(5 - \frac{1}{2}\right) - \left(6 - \frac{1}{4}\right) = \\
 &= \left(\frac{10 - 1}{2}\right) - \left(\frac{24 - 1}{4}\right) = \\
 &= \frac{9}{2} - \frac{23}{4} = \\
 &= \frac{18 - 23}{4} = -\frac{5}{4}
 \end{aligned}$$

$[(a)^{-3}]^2 : a^2 \cdot a^7 \cdot a^{-2} =$	$a = -\frac{2}{3}$
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$$\begin{aligned}
 &= \left[\left(-\frac{2}{3}\right)^{-3} \right]^2 : \left(-\frac{2}{3}\right)^2 \cdot \left(-\frac{2}{3}\right)^7 \cdot \left(-\frac{2}{3}\right)^2 = \\
 &= \left[-\frac{2}{3} \right]^{-3 \cdot 2} : \left(-\frac{2}{3}\right)^2 \cdot \left(-\frac{2}{3}\right)^7 \cdot \left(-\frac{2}{3}\right)^2 = \\
 &= \left[-\frac{2}{3} \right]^{-6-2} \cdot \left(-\frac{2}{3}\right)^7 \cdot \left(-\frac{2}{3}\right)^2 = \\
 &= \left[-\frac{2}{3} \right]^{-8} \cdot \left(-\frac{2}{3}\right)^7 \cdot \left(-\frac{2}{3}\right)^2 = \\
 &= \left[-\frac{2}{3} \right]^{-8+7} \cdot \left(-\frac{2}{3}\right)^2 = \\
 &= \left[-\frac{2}{3} \right]^{-1} \cdot \left(-\frac{2}{3}\right)^2 = \\
 &= \left[-\frac{2}{3} \right]^{-1+2} = -\frac{2}{3}
 \end{aligned}$$

$-x^3 - x^2 - x - y^2 - y =$	$x = -2; y = +3$
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$$\begin{aligned} & -(-2)^3 - (-2)^2 - (-2) - 3^2 - 3 = \\ & = -(-8) - 4 + 2 - 9 - 3 = \\ & = +8 - 4 + 2 - 9 - 3 = \\ & = 10 - 16 = \\ & = -6 \end{aligned}$$

$\frac{1}{2a} + a - \frac{1}{2}b =$	$a = -3; b = -8$
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$$\begin{aligned} & \frac{1}{2 \cdot (-3)} + (-3) - \frac{1}{2}(-8) = \\ & -\frac{1}{6} - 3 + 4 = \\ & = -\frac{1}{6} + 1 = \\ & = -\frac{1}{6} + \frac{6}{6} = \\ & = \frac{5}{6} \end{aligned}$$

$\frac{1}{3}b - a^2 - \frac{1}{10}ab =$	$a = -2; b = -4$
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$$\frac{1}{3} \cdot (-4) + (-2)^2 - \frac{1}{10} \cdot (-2) \cdot (-4) =$$

$$-\frac{4}{3} + 4 - \frac{4}{5} =$$

$$= \frac{-20 + 60 - 12}{15} =$$

$$= \frac{28}{15}$$

$-x^3 - \frac{1}{2}x^2y - \frac{1}{3}x - y =$	$x = -\frac{1}{2}; y = \frac{1}{3}$
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$$-\left(-\frac{1}{2}\right)^3 - \frac{1}{2} \cdot \left(-\frac{1}{2}\right)^2 \cdot \left(\frac{1}{3}\right) - \frac{1}{3} \cdot \left(-\frac{1}{2}\right) - \frac{1}{3} =$$

$$= -\left(-\frac{1}{8}\right) - \frac{1}{2} \cdot \left(\frac{1}{4}\right) \cdot \left(\frac{1}{3}\right) + \frac{1}{6} - \frac{1}{3} =$$

$$= \frac{1}{8} - \frac{1}{24} + \frac{1}{6} - \frac{1}{3} =$$

$$= \frac{3 - 1 + 4 - 8}{24} =$$

$$= -\frac{2}{24} = -\frac{1}{12}$$

$\frac{(a+b)(a-b)}{a^2-b^2} =$	$a = 3; b = -3$
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$$\frac{(3-3)(3+3)}{3^2-(-3)^2} =$$

$$= \frac{0 \cdot 6}{9-9} =$$

$$= \frac{0}{0}$$

Indeterminata

Tutti i numeri moltiplicati per zero danno come risultato zero.

$\frac{1}{3}x - 2y + \frac{2}{3}xy - y =$	$x = -\frac{3}{2}; y = \frac{5}{6}$
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$$\frac{1}{3} \cdot \left(-\frac{3}{2}\right) - 2 \cdot \left(\frac{5}{6}\right) + \frac{2}{3} \cdot \left(-\frac{3}{2}\right) \cdot \left(\frac{5}{6}\right) - \frac{5}{6} =$$

$$= -\frac{1}{2} - \frac{5}{3} - \frac{5}{6} - \frac{5}{6} =$$

$$= \frac{-3-10-5-5}{6} =$$

$$= -\frac{23}{6}$$

$\frac{a^2 - (-b)}{1 + 2(a + b) - b} =$	$a = -3; b = +5$
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$$\begin{aligned} & \frac{(-3)^2 - (-5)}{1 + 2 \cdot (-3 + 5) - 5} = \\ & = \frac{9 + 5}{1 + 4 - 5} = \\ & = \frac{14}{0} \end{aligned}$$

Impossibile

Qualsiasi numero per zero non può restituire se non zero.

$\frac{a^2 - (-b)}{1 + 2(a + b) - b} =$	$a = 3; b = -5$
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$$\begin{aligned} & \frac{3^2 - (-(-5))}{1 + 2 \cdot (3 - 5) - (-5)} = \\ & = \frac{9 - 5}{1 - 4 + 5} = \\ & = \frac{4}{2} = 2 \end{aligned}$$

$$2x^3y^3 + 2 + xy^3 - 6x^2y^3 + 3 - xy^3 + 3x^2y^3 - 5 + 2x^2y^3 - 2x^3y^3 =$$

$$x = 1; y = -1$$

I fattori 1, 1^2 e 1^3 sono elemento neutro in una moltiplicazione e si possono omettere.

In questo modo la scrittura per sostituzione diviene la seguente.

$$\begin{aligned} & = 2 \cdot (-1)^3 + 2 + (-1)^3 - 6 \cdot (-1)^3 + 3 - (-1)^3 + 3 \cdot (-1)^3 - 5 + 2 \cdot (-1)^3 - 2 \cdot (-1)^3 = \\ & = 2 \cdot (-1) + 2 + (-1) - 6 \cdot (-1) + 3 - (-1) + 3 \cdot (-1) - 5 + 2 \cdot (-1) - 2 \cdot (-1) = \\ & = -2 + 2 - 1 + 6 + 3 + 1 - 3 - 5 - 2 + 2 = \\ & = +6 - 5 = -1 \end{aligned}$$

KEYWORDS

 *Algebra, calcolo letterale, monomio, polinomio, binomio, trinomio, prodotti notevoli, esercizi con soluzioni*

  *Algebra, Monomial, Polynomial, binomial, trinomial, perfect square trinomials, algebraic factoring, exercises with solution*

 *Algebra, Polinomio, monomio, binomio, trinomio, Igualdades notables, operaciones con polinomios,*

 *Algèbre, Polynôme, Monôme, Polynômes remarquables*

 *Algebra, Polynom, Binom*