

Problema: AL0031 - Algebra letterale**Testo** [AL0031] [1 ★ 2 🍷 1 📖] Semplifica le seguenti espressioni con i polinomi.

(a) $\left(\frac{1}{3}x^3 + 3x^2y + 6xy^2 - \frac{1}{3}y^3\right)\left(-\frac{1}{2}xy\right)^2 - 5xy^3\left(\frac{3}{20}x^3 + \frac{3}{10}x^2y\right)$

(b) $\left(\frac{2}{3}ab^2\right)\left(3ab^2 - b^3 + \frac{3}{2}a\right)\left(-\frac{1}{2}a\right) + (-a)^2\left(ab^4 + 2b^5 + \frac{1}{2}ab^2\right)$

(c) $\frac{3}{2}x^2(x^2 + y^2 - xy) + \frac{1}{5}y^2\left(\frac{3}{2}x^2 - 3y^2\right) + \frac{1}{2}\left(\frac{6}{5}y^4 - 3x^4\right) - 8x^2\left(\frac{1}{5}y^2\right)$

(d) $\left(\frac{1}{2}a^3b^2\right)\left(4a^2 - 6b^3 + \frac{2}{3}ab\right) - a^5\left(2b^2 - \frac{1}{2}ab^3\right) + 3ab^5\left(a^4 - \frac{1}{6}\right)$

(e) $\left(\frac{3}{4}x^2y - \frac{1}{2}xy^2\right)\left(\frac{4}{3}x - 2y\right) + \frac{1}{3}xy(3y^2 - 4x^2)$

(f) $\left(\frac{2}{5}a^2b\right)\left(\frac{5}{4}a^3 - 10ab^2 + \frac{5}{2}b^4\right) - \frac{1}{2}a^5b + 4a^3b^3$

(g) $\frac{1}{2}\left(\frac{1}{3}xy\right)^3(9x^2y^2) - \left(-\frac{1}{3}x^2y^2\right)(x^3y) + \frac{1}{6}x^5y^5$

(h) $\xi = \left(\frac{3}{2}ab^2\right)^2 - \left(\frac{3}{4}ab^4 - \frac{1}{2}ab^2\right)(2a) + \left(\frac{1}{2}ab^2\right)\left(3a - \frac{3}{2}ab^2\right)$

(i) $\left(\frac{1}{4}x^2 - \frac{1}{3}y^2\right)(-2x^2) - \left(\frac{1}{2}x^2 - y^2\right)\left(\frac{1}{2}x^2 + y^2\right) + \frac{1}{2}x^4 - \frac{1}{3}x^2y^2$

(j) $\left[(a - 2b)^2 - a(a - 4b)\right]\left(-\frac{1}{4}b\right) + \left(\frac{1}{2}b\right)^3(4b)$

(k) $\left(\frac{1}{2}x - y\right)^2(2x) - \left(\frac{1}{4}x^3 - 2x^2y + 2xy^2\right) + \frac{1}{3}xy^2$

(l) $\left(\frac{2}{3}a^2 + 3b\right)\left(\frac{3}{2}a - b\right) - \frac{1}{2}a\left(2a^2 - 4a^2b + \frac{1}{3}ab\right)$

(m) $\left(\frac{1}{2}x^2y\right)\left(4x - \frac{2}{3}y^2\right) + \frac{1}{3}x^2y^3 - 2x^3y$

(n) $\left(\frac{2}{3}ab^2\right)^2\left(3a - \frac{3}{2}b\right) - \frac{4}{3}a^3b^4$

(o) $\left(\frac{1}{3}x^2 - 2y\right)\left(\frac{1}{3}x^2 + 2y\right) - \frac{1}{9}x^4 + 3y\left(y + \frac{1}{3}\right) - 3y^2$

(p) $\left(\frac{1}{2}a\right)^3\left(8a^2 - 4ab + \frac{16}{3}b^3\right) - a^2\left(a^3 - \frac{1}{2}a^2b\right)$

(q) $2x\left(\frac{1}{4}x^2 - xy + \frac{1}{2}y^2\right) - y\left(-x^2 + xy - \frac{1}{3}y^2\right) - \frac{1}{2}x^3$

Spiegazione

Svolgimento Qui di seguito le soluzioni degli esercizi proposti

(a)

$$\left(\frac{1}{3}x^3 + 3x^2y + 6xy^2 - \frac{1}{3}y^3\right) \cdot \frac{1}{4}x^2y^2 - \frac{3}{4}x^4y^3 - \frac{3}{2}x^3y^4$$

$$\frac{1}{12}x^5y^5 + \frac{3}{4}x^4y^3 + \frac{3}{2}x^3y^4 - \frac{1}{12}x^2y^5 - \frac{3}{4}x^4y^3 - \frac{3}{2}x^3y^4$$

$$\frac{1}{12}x^5y^5 - \frac{1}{12}x^2y^5$$

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(b)

$$-\left(\frac{1}{3}a^2b^2\right)\left(3ab^2 - b^3 + \frac{3}{2}a\right) + a^2\left(ab^4 + 2b^5 + \frac{1}{2}ab^2\right)$$

$$-a^3b^4 + a^2b^5 - \frac{1}{2}a^3b^2 + a^3b^4 + 2a^2b^5 + \frac{1}{2}a^3b^2$$

$$3a^2b^5$$

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(c)

$$\frac{3}{2}x^4 + \frac{3}{2}x^2y^2 - \frac{3}{2}x^3y + \frac{3}{10}x^2y^2 - \frac{3}{5}y^4 + \frac{3}{5}y^4 - \frac{3}{2}x^4 - \frac{8}{5}x^2y^2$$

$$-\frac{3}{2}x^3y + \frac{1}{5}x^2y^2$$

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(d) $\frac{1}{2}a^5b^3 - 3ab^5.$

(e) $-\frac{5}{3}x^2y^2 + y^3x.$

(f) $\frac{1}{2}a^5b - 4a^3b^3 + a^2b^5.$

(g) $\frac{2}{3}x^5y^5.$

(h) $\xi = \left(\frac{3}{2}ab^2\right)^2 - \left(\frac{3}{4}ab^4 - \frac{1}{2}ab^2\right)(2a) + \left(\frac{1}{2}ab^2\right)\left(3a - \frac{3}{2}ab^2\right)$

$$\xi = \frac{9}{4}a^2b^4 + \left(-\frac{3}{4}ab^4 + \frac{1}{2}ab^2\right)(2a) + \frac{3}{2}a^2b^2 - \frac{3}{4}a^2b^4$$

$$\xi = \frac{9}{4}a^2b^4 - \frac{6}{4}a^2b^4 + a^2b^2 + \frac{3}{2}a^2b^2 - \frac{3}{4}a^2b^4 = \frac{5}{2}a^2b^2.$$

(i) $\frac{2}{3}y^4.$

(j) $b^4 - b^2.$

(k) $\frac{1}{4}x^3 + \frac{1}{3}xy^2.$

(l) $\frac{4}{3}a^2b + \frac{13}{3}ab - 3b^2.$

(m) 0.

(n) $-\frac{2}{3}a^2b^5.$

(o) $-4y^2 + y.$

(p) $\frac{2}{3}a^3b^3.$

(q) $-x^2y + \frac{1}{3}y^3.$
