

ESERCIZI IN PIÙ

LE ESPRESSIONI CON I PRODOTTI NOTEVOLI

Semplifica le seguenti espressioni.

$$1 \quad \left(x - \frac{1}{5}y\right)^2 - \left(\frac{8}{15}y + \frac{11}{2}x\right)^2 + \left(\frac{9}{2}x + \frac{2}{3}y\right)^2 - \left[\left(\frac{1}{5}y - 3x\right)\left(3x + \frac{1}{5}y\right) + \left(-\frac{2}{5}y\right)^2\right] \quad \left[-\frac{4}{15}xy\right]$$

$$2 \quad \left[\left(\frac{2}{3}x + \frac{1}{2}y\right)^3 - \left(\frac{2}{3}x + \frac{1}{2}y\right)\left(\frac{4}{9}x^2 + \frac{1}{4}y^2 - \frac{1}{3}xy\right)\right] : 2x + \left(\frac{1}{3}x + \frac{1}{2}y\right)\left(\frac{1}{3}x - \frac{1}{2}y\right) + \frac{2}{3}x\left(y - \frac{1}{6}x\right) \quad [xy]$$

$$3 \quad \left[\left(\frac{5}{6}x^2 + 3x\right)^3 - \left(\frac{5}{6}x^2 - 3x\right)^3\right] : (2x^3) - \left[\left(\frac{5}{2}x - 8\right)^2 + 4(10x + 1)\right] \quad [-41]$$

$$4 \quad \left\{\left[\left(\frac{1}{2}a - \frac{2}{3}b\right)\left(\frac{1}{2}a + \frac{2}{3}b\right)^3 - \left(\frac{1}{4}a^2 - \frac{4}{9}b^2\right)\left(\frac{4}{9}b^2 + \frac{1}{4}a^2\right)\right] - \frac{1}{3}ab\left(\frac{1}{2}a^2 + \frac{1}{9}b^2\right)\right\}^3 \quad \left[-\frac{1}{27}a^3b^9\right]$$

$$5 \quad \left[\left(-x^2y - \frac{1}{25}\right)^2 - (9x + 27xy^2)(-3y) - \left(\frac{1}{25} + x^2y\right)^2 - 27xy(3y^2 + 1)\right] : (xy^2 - 7)^2 \quad [0]$$

$$6 \quad \left(\frac{2}{5}x^2 - y^3\right)\left(y^3 + \frac{2}{5}x^2\right) - \left[\left(\frac{1}{2}x + \frac{2}{3}y\right)^3 - \frac{1}{6}xy(3x + 4y) - \frac{8}{27}y^3\right] \cdot 8x \quad \left[-\frac{21}{25}x^4 - y^6\right]$$

$$7 \quad \left(\frac{3}{4}x^3 - \frac{2}{3}y^5\right)^2 - \left(-\frac{2}{3}y^5 - \frac{3}{4}x^3\right)\left(\frac{2}{3}y^5 - \frac{3}{4}x^3\right) + 8y^5 \cdot \left[\left(\frac{1}{2}x - y^2\right)^3 + y^2\left(y^4 - \frac{3}{2}xy^2\right)\right] \quad \left[\frac{8}{9}y^{10} - 6x^2y^7\right]$$

$$8 \quad -\left(\frac{1}{5}ab^2 + \frac{3}{2}\right)^2 - \left(\frac{2}{3}a - \frac{1}{2}b\right)^3 - \left[\left(\frac{1}{2}b - \frac{1}{3}a\right)^3 - \left(\frac{1}{5}ab^2 + \frac{3}{2}\right) \cdot \left(\frac{1}{5}ab^2 - \frac{3}{2}\right)\right] + a\left(-\frac{17}{20}b^2 - \frac{7}{27}a^2\right) \quad \left[-\frac{9}{2} + \frac{1}{2}a^2b\right]$$

$$9 \quad \left(\frac{1}{3}a + 2b - \frac{1}{2}\right)^2 - \left(-\frac{1}{3}a - 2b\right)^2 - \left(\frac{1}{4}a^2 + b^2\right)\left(\frac{1}{2}a - b\right)\left(\frac{1}{2}a + b\right) - \frac{1}{4} \cdot \left(1 - \frac{1}{2}a^2\right)\left(1 + \frac{1}{2}a^2\right) \quad \left[b^4 - 2b - \frac{1}{3}a\right]$$

$$10 \quad \left(x - y + \frac{1}{2}\right)\left(x - y - \frac{1}{2}\right) - (x - y)^2 + \left(\frac{1}{3}x^2 - \frac{3}{2}\right)^3 - x^2\left(\frac{1}{27}x^4 - \frac{1}{2}x^2 + \frac{9}{4}\right) \quad \left[-\frac{29}{8}\right]$$

$$11 \quad \left[\left(a^{\frac{1}{4}} - 1\right)\left(a^{\frac{1}{4}} + 1\right)\left(a^{\frac{1}{2}} + 1\right)(a + 1) + 2\right]^2 - a(a - 1)[(a - 1)^2 + 3a] - 2a^2 \quad [a + 1]$$

$$12 \quad (a^m + a^n)^2 - (a^m + a^n)(a^m - a^n) - 2a^n(a^m + a^n) \quad [0]$$

$$13 \quad \left(\frac{1}{2}b - 1\right)^2 - \left(\frac{1}{3}a + \frac{1}{2}b - 1\right)^2 + \left(\frac{1}{3}a - 1\right)\left(\frac{1}{3}a + 1\right) + \frac{2}{3}a\left(\frac{1}{2}b - 1\right) \quad [-1]$$

$$14 \quad \left(2a^2 - \frac{1}{3}\right)^3 - 2a^2 \left[\left(\frac{1}{3} + \frac{3}{2}a + 2a^2\right)^2 - \frac{67}{12}a^2 + \frac{2}{9} \right] + 3a^3(2a+1)(2a-1) \quad \left[-5a^3 - \frac{1}{27} \right]$$

$$15 \quad \frac{1}{16} \left(\frac{4}{3}a - 1\right) \left(\frac{4}{3}a + 1\right) \left(\frac{16}{9}a^2 + 1\right) + \frac{1}{2} \left(\frac{4}{9}a^2 + \frac{1}{4}\right) - \left(\frac{4}{9}a^2 + \frac{1}{4}\right)^2 \quad [0]$$

$$16 \quad x \cdot \left(\frac{4}{3}x + \frac{2}{3}y^2\right)^2 - 6 \left(\frac{2}{3}x + 1\right) \left(\frac{4}{9}x^2 + 1 - \frac{2}{3}x\right) + \left(3 + \frac{4}{3}xy\right) \left(3 - \frac{4}{3}xy\right) + \frac{5}{9}xy^4 \quad [xy^4 + 3]$$

$$17 \quad \left(\frac{1}{5}x + \frac{2}{5}y\right)^3 - \left(\frac{x}{5} + \frac{2}{5}y\right) \left(\frac{x^2}{25} + \frac{4}{25}y^2 - \frac{2xy}{25}\right) - \frac{2}{25} \cdot \left[x \left(\frac{3}{5}xy + y\right) + 3y \left(\frac{2xy}{5} - \frac{x}{3}\right) \right] \quad [0]$$

$$18 \quad \left(\frac{1}{3}x^2 + \frac{2}{9}y^2 - 4\right)^2 - \left(\frac{2}{9}y^2 + 4\right) \left(\frac{2}{9}y^2 - 4\right) + \frac{8}{9}x^2 + \frac{16}{9}(x+y)^2 - \frac{4}{9}xy \left(\frac{xy}{3} + 8\right) \quad \left[\frac{x^4}{9} + 32 \right]$$

$$19 \quad \left(\frac{ab}{2} - xy\right) \left(\frac{a^2b^2}{4} + \frac{abxy}{2} + x^2y^2\right) - \frac{3}{4}abxy(a+2x)(b-y) - \left(\frac{1}{2}ab - xy\right)^3 \quad \left[\frac{3}{4}a^2bxy^2 - \frac{3}{2}ab^2x^2y \right]$$

$$20 \quad \left(a^3 + \frac{1}{2}\right) \left(a^3 - \frac{1}{2}\right) - \frac{3}{4}x \left(\frac{3}{2}x - 1\right) (3x+2) + \left(\frac{3}{2}x - a^2\right) \left(\frac{9}{4}x^2 + \frac{3a^2x}{2} + a^4\right) + \left(x + \frac{1}{2}\right)^2 \quad \left[x^2 + \frac{5}{2}x \right]$$