

# Esercizi di consolidamento

*Semplifica le seguenti espressioni sui monomi.*

$$1 \quad \left(-xy + \frac{3}{2}xy\right)^2 (-x^2y) - (2xy)^6 : (16x^2y^3) \quad \left[-\frac{17}{4}x^4y^3\right]$$

$$2 \quad (-3m^2)^5 : (-9m^2)^3 - (-m^3n)^4 : (-m^2n)^4 + (-2m^2)^2 \quad \left[\frac{10}{3}m^4\right]$$

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

$$4 \quad \left[\frac{3}{4}ab^3 \cdot \left(-\frac{1}{9}a^2b^2\right) - \left(-\frac{3}{2}a^2b^3\right)^2 : \left(+\frac{9}{8}ab\right) + 2a^3b^5\right] : \left(-\frac{1}{6}a^2b^2\right) \quad \left[\frac{1}{2}ab^3\right]$$

$$5 \quad \left[\left(\frac{3}{2}a^3b\right)^2 : \left(-\frac{3}{4}ab\right)\right]^2 : \left(-\frac{2}{3}a^6b^2\right) + \left[\frac{5}{2}a^4 - 3a^3 \cdot \left(-\frac{1}{4}a\right)\right] \quad \left[-\frac{41}{4}a^4\right]$$

$$6 \quad \left[\left(\frac{1}{4}ab^2\right)^3 : \left(\frac{1}{8}a^2b^2\right)\right]^2 : \left[\left(\frac{1}{2}a^4b^3\right) : \left(\frac{2}{5}a^2b\right)\right] \quad \left[\frac{1}{80}b^6\right]$$

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

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

$$9 \quad \left\{\left[-\frac{12}{5}a^2b^2 \cdot \left(-\frac{25}{6}a^3b^3\right)\right] : (5ab)^2\right\} : \left[\frac{2}{5} \cdot (ab)^6 : a^3b^3\right] \quad [1]$$

$$10 \quad \left\{\left[\left(-\frac{1}{4}a^2b^4\right)^2 - \left(+\frac{1}{2}ab^2\right)^4 - (-ab^2)^4\right] : \left(\frac{1}{2}a^2b\right)^2\right\}^2 : (2b)^3 \quad [2b^9]$$

$$11 \quad \left[-\frac{2}{3} \cdot (x^2z)^2\right]^3 : \left(-\frac{5}{9}x^4z^5\right) : \left(\frac{11}{10}x^2 + \frac{1}{2}x^2 + \frac{2}{5}x^2\right)^4 - \left(\frac{2}{3}x^2z\right)^2 : \left(\frac{1}{3}x^4z\right) \quad \left[-\frac{13}{10}z\right]$$

$$12 \quad \left[\left(\frac{1}{2}x - 2x\right)^2 \cdot \left(yz + \frac{1}{3}yz\right)\right]^2 + \left(\frac{2}{5}xy\right)^2 \cdot (7y - 2y) - (-3x^2yz^2)^3 : (-3x^2yz^4) \quad \left[\frac{4}{5}x^2y^3\right]$$

$$13 \quad \left[-3\left(-xy - \frac{1}{3}xy\right)^3\right] : (5xy + 3xy)^2 + \left(\frac{1}{3}x^2y - x^2y\right)^2 + \frac{1}{5}x \cdot \left(\frac{2}{3}x^2y^3 + \frac{1}{6}x^2y^3\right) : \left[\left(-\frac{3}{2}\right)(xy)^2\right] \quad \left[\frac{4}{9}x^4y^2\right]$$

$$14 \quad \left[\left(\frac{1}{2}a + \frac{1}{3}a + \frac{1}{6}a\right)^3 \cdot (-bc)^2 + \left(\frac{1}{3}a^2bc^2 + \frac{2}{15}a^2bc^2 - \frac{5}{3}a^2bc^2\right) \cdot \left(ab - \frac{1}{6}ab\right) + (ab)^4 \cdot \left(\frac{1}{4}c - \frac{1}{5}c\right)\right] : \left[\left(-\frac{1}{5}c\right)(-ab)^2\right] \quad \left[-\frac{1}{4}a^2b^2\right]$$

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

$$16 \left\{ \left[ - (17xz + 15xz) \left( \frac{1}{2}x^2y \right)^4 \cdot (-z) \right] - \left[ (-5yz^2x) \left( yz - \frac{1}{2}yz \right)^2 \right] - \left[ \left( \frac{1}{2}y^2z^4 + \frac{1}{4}y^2z^4 - \frac{1}{3}y^2z^4 \right) \cdot 3xy \right] \right\} : (x^3yz)^2 \quad [2x^3y^2z]$$

$$17 \left( \frac{4}{3}x^3y^3z - \frac{1}{4}x^3y^3z - \frac{5}{6}x^3y^3z \right) - \left[ \left( \frac{1}{2}xy \right)^2 \cdot \left( \frac{2}{9}xyz + \frac{1}{3}xyz + \frac{4}{9}xyz \right) \right] + \left[ (x^4y^2z^4) : \left( \frac{3}{5}x^4yz^3 \right) \right] \quad \left[ \frac{5}{3}yz \right]$$

$$18 \left\{ \left[ \left( -\frac{3}{2}ab \right) : \left( -\frac{3}{2}ab \right) \right]^2 : \left( \frac{81}{16}a^3b^3 \right)^2 + \left( \frac{11}{10}a^2b + \frac{1}{2}a^2b + \frac{2}{5}a^2b \right) \left( ab^2 + \frac{1}{2}ab^2 \right) - (-ab)^2 \right\} : (+ab)^2 \quad [3ab]$$

$$19 \left[ \left( abc - \frac{1}{7}abc \right)^2 \cdot (50a^3b - a^3b) \right]^2 : \left( \frac{6}{5}ab^3c \cdot (27a^2c + 3a^2c) \right)^2 - \left( -\frac{3}{2}a^2 \right)^3 : (3a)^2 \quad \left[ \frac{11}{8}a^4 \right]$$

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

$$21 \left[ \left( \frac{3}{20}x^4y^3z^5 - \frac{1}{2}x^4y^3z^5 + \frac{1}{20}x^4y^3z^5 \right) : \left( x^2y^2z - \frac{7}{10}x^2y^2z \right)^2 \right] \cdot \left( y - \frac{1}{5}y - \frac{1}{2}y \right)^2 - \frac{3}{4}xy^2z^4 : \left( +\frac{5}{2}xyz \right) \quad \left[ -\frac{3}{5}yz^3 \right]$$

$$22 \left[ (-3a^3b^3c^4)^2 \cdot \left( -\frac{1}{3}a^2bc^2 \right) : \left( \frac{3}{2}a^8b^7c^6 + 3a^8b^7c^6 \right) \right] + \left[ \left( \frac{1}{6}a^2b^4c^4 - \frac{1}{5}a^2b^4c^4 + \frac{3}{10}a^2b^4c^4 \right) : \left( ab^2 - \frac{3}{5}ab^2 \right)^2 \right] \quad [c^4]$$

$$23 \left\{ \left[ \left( \frac{8}{3}xy^2z^3 \right) \cdot \left( \frac{15}{2}x^3yz - \frac{3}{4}x^3yz \right) \right] : \left( 5xyz - \frac{1}{2}xyz \right)^2 + \left[ \left( \frac{2}{3}xyz \right)^2 : \left( \frac{11}{4}y + \frac{5}{4}y \right) \right] \right\} : \left( -\frac{1}{2}xz \right)^2 \quad [4y]$$

$$24 \left( \frac{2}{3}xy \right)^2 \cdot \left( 2y - \frac{1}{2}y - \frac{3}{2}y \right)^2 \cdot \left( -\frac{1}{2}x^2 \right) + \left[ \left( \frac{1}{2}x - 2x \right)^2 \cdot \left( y^2 + \frac{1}{3}y^2 \right) \right]^2 - \frac{15}{4}x^4y^4 \quad \left[ \frac{21}{4}x^4y^4 \right]$$

$$25 \left( \frac{1}{3}ab^2 + \frac{1}{18}ab^2 + \frac{1}{6}ab^2 \right) \cdot \left( \frac{3}{2}a^2b + \frac{1}{5}a^2b + \frac{1}{10}a^2b \right) : \left( \frac{1}{2}ab \right)^3 - \left( \frac{20}{3}a^3 \right) \cdot \left( b^3 - \frac{1}{2}b^3 - \frac{1}{5}b^3 \right) + \left( -\frac{64}{7}a^2 \right) \left( \frac{5}{2}b^2 + b^2 \right) : (2ab)^2 \quad [-2a^3b^3]$$

$$26 \left\{ \left[ \left( \frac{6}{5} x^4 y^3 z^5 - x^4 y^3 z^5 \right) : \left( \frac{1}{2} x y z \right)^2 \right]^2 \cdot \left[ \left( \frac{1}{2} y z - 3 y z \right)^2 : \left( \frac{1}{2} z^3 \right) \right] \right\} + \left[ \frac{8}{9} x^6 y^6 z^5 : \left( x y - \frac{1}{3} x y \right)^2 \right]$$

[10x<sup>4</sup>y<sup>4</sup>z<sup>5</sup>]

$$27 \left\{ \left( \frac{4}{3} x^3 y z - \frac{1}{4} x^3 y z + \frac{1}{12} x^3 y z \right) - \left[ \left( \frac{1}{3} x z \right)^2 \cdot \left( \frac{3}{2} y^2 z + 2 y^2 z - \frac{1}{2} y^2 z \right)^2 : \left( -\frac{1}{2} y z \right)^3 \right] + \right. \\ \left. - \left[ (x^4 y^2 z^4) : \left( \frac{6}{7} x y z^3 \right) \right] \right\} : (-2x)^2$$

[2yz]

$$28 \left[ \left( \frac{1}{2} x y + \frac{1}{3} x y \right)^2 : \left( \frac{1}{9} x + \frac{7}{12} x \right) \right] + \left( \frac{1}{4} x + x \right) \left( \frac{5}{3} y + \frac{1}{3} y \right)^2 - \left[ (3xy)^3 : \left( \frac{3}{2} x^2 y + \frac{1}{5} x^2 y + \frac{1}{10} x^2 y \right) \right]$$

[-9xy<sup>2</sup>]

$$29 \frac{1}{5} x^2 \cdot \left( \frac{1}{2} z - z \right) + \left[ \left( x^2 z - \frac{1}{5} x^2 z \right) : \left( \frac{1}{2} x \right)^2 \right] \cdot \left( \frac{7}{2} x y + x y + \frac{1}{2} x y \right) + \left( -\frac{1}{2} x y z \right)^4 : \\ : \left( \frac{5}{2} x^2 y^4 z^3 - \frac{3}{4} x^2 y^4 z^3 - \frac{9}{8} x^2 y^4 z^3 \right)$$

[16xyz]