ESERCIZI SVOLTI: ESPONENTI LETTERALI

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18. $(a^n)^{m+n} = a^{nm+n^2}$ $\quad (a^{n+2m})^3 = a^{3n+6m}$ $\quad (a^{n+2})^4 = a^{4n+8}$

$(a^{n+2})^4 = a^{4n+8}$ $\quad (a^{2n+3})^3 = a^{6n+9}$ $\quad (-a^3)^{2(n+n)} = a^{12n}$

La potenza di una potenza è una potenza che ha per base la stessa base e per esponente il prodotto degli esponenti

19. $[(a^{3+2n})^3 : (a^{n+1})^3]^4 : (a^{2+n})^3 = (a^{9+6n} : a^{3n+3})^4 : a^{6+2n} = (a^{6+3n})^4 : a^{6+2n} =$

$= a^{24+12n} : a^{6+2n} = a^{18+10n}$ Il quoziente di due o più potenze che hanno la stessa base è una potenza che ha per base la stessa base e per esponente la differenza degli esponenti.

20. $(b^{3+2n+n^2})^2 : (b^{2n})^{n+1} : [(b^{2n+3})^n : (b^{1+n})^{2n}] = b^{6+4n+2n^2} : b^{2n^2+2n} : (b^{2n^2+3n} : b^{2n+2n^2}) =$

$= b^{6+4n+2n^2-(2n^2+2n)} : b^{2n^2+3n-(2n+2n^2)} = b^{6+2n} : b^n = b^{6+2n-n} = b^{6+n}$

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24. $(x^{2n+3})^{n+1} = x^{2n^2+2n+3n+3} = x^{2n^2+5n+3}$

$(x^{n+2m})^{m+n} = x^{(n+2m)(m+n)} = x^{nm+n^2+2m^2+2nm} = x^{2n^2+3nm+2m^2}$

$[(x^{1+n})^2]^n = (x^{1+n})^{2n} = x^{2n+2n^2}$

25. $$\frac{(a^{6n+1})^{2n+3} : (a^{2n+3})^2}{(a^n)^{2n+3}} : (a^{5n+1})^{2n+1} = \frac{a^{12n^2+18n+2n+3} : a^{4n+6}}{a^{2n^2+3n}} : a^{10n^2+5n+2n+1} =$$

$$= \frac{a^{12n^2+20n+3-(4n+6)}}{a^{2n^2+3n}} : a^{10n^2+7n+1} = \frac{a^{12n^2+16n-3}}{a^{2n^2+3n}} : a^{10n^2+7n+1} = a^{12n^2+16n-3-(2n^2+3n)} : a^{10n^2+7n+1} =$$

$$= a^{10n^2+13n-3} : a^{10n^2+7n+1} = a^{10n^2+13n-3-(10n^2+7n+1)} = a^{6n-4}$$

27. $$\frac{(a^{2n-1})^2 \cdot (a^{3+n})^2 : a^{n-2}}{(a^n)^2 : a^{n-5}} + \frac{(a^{n-3})^{n-2}}{(a^n)^{n-5} \cdot a^4} - \frac{a^{n+4}}{a^{2+n}} =$$

$$= \frac{a^{4n-2} \cdot a^{6+2n} : a^{n-2}}{a^{2n} : a^{n-5}} + \frac{a^{(n-3)(n-2)}}{a^{n^2-5n} \cdot a^4} - a^{n+4-(2+n)} =$$

$$= \frac{a^{4n-2+6+2n} : a^{n-2}}{a^{2n-(n-5)}} + \frac{a^{n^2-2n-3n+6}}{a^{n^2-5n+4}} - a^2 =$$

$$= \frac{a^{6n+4-(n-2)}}{a^{n+5}} + a^{n^2-5n+6-(n^2-5n+4)} - a^2 = a^{5n+6-(n+5)} + a^2 - a^2 = a^{4n+1}$$

28. $$\left\{ \frac{(a^2)^{n+3} \cdot (a^3)^{n+3} : a^{3n+8}}{a^{n+3} \cdot a^{n+6} : a^4} + \frac{(a^{n+2})^{n+3} \cdot a^2}{(a^{n+5})^n \cdot (a^2)^3} + \frac{a^{7+n}}{a^{n+5}} \right\}^2 =$$

$$= \left\{ \frac{a^{2n+6} \cdot a^{3n+9} : a^{3n+8}}{a^{n+3+n+6} : a^4} + \frac{a^{(n+2)(n+3)} \cdot a^2}{a^{n^2+5n} \cdot a^6} + a^{7+n-(n+5)} \right\}^2 =$$

$$= \left\{ \frac{a^{2n+6+(3n+9)} : a^{3n+8}}{a^{2n+9-4}} + \frac{a^{n^2+3n+2n+6} \cdot a^2}{a^{n^2+5n+6}} + a^2 \right\}^2 =$$

$$= \left\{ \frac{a^{5n+15} : a^{3n+8}}{a^{2n+5}} + \frac{a^{n^2+5n+6} \cdot a^2}{a^{n^2+5n+6}} + a^2 \right\}^2 =$$

$$= \left\{ \frac{a^{5n+15-(3n+8)}}{a^{2n+5}} + a^2 + a^2 \right\}^2 = \left\{ \frac{a^{2n+7}}{a^{2n+5}} + a^2 + a^2 \right\}^2 = \left\{ a^{2n+7-(2n+5)} + a^2 + a^2 \right\}^2 =$$

$$= (a^2 + a^2 + a^2)^2 = (3a^2)^2 = 9a^4$$

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50. $$\left\{ \frac{(a^{2n-1})^{-3} : a^{-n^2} \cdot (a^5)^n}{(a^n)^{n-1}} + \frac{a^{n+4}}{a^{n+1}} \right\}^6 = \left\{ \frac{a^{-6n+3} : a^{-n^2} \cdot a^{5n}}{a^{n^2-n}} + a^{n+4-(n+1)} \right\}^6 =$$

$$= \left\{ \frac{a^{-6n+3-(-n^2)} \cdot a^{5n}}{a^{n^2-n}} + a^3 \right\}^6 = \left\{ \frac{a^{n^2-6n+3+5n}}{a^{n^2-n}} + a^3 \right\}^6 = \left\{ a^{n^2-n+3-(n^2-n)} + a^3 \right\}^6 =$$

$$= (a^3 + a^3)^6 = (2a^3)^6 = 64a^{18}$$

51. $$\frac{(3x^n - 2y^n)(x^n + 2y^n) - (3x^n + y^n)(x^n - 2y^n) - 3y^n(3x^n - y^n)}{\left[\left(-\frac{1}{2} a^{6n} x^{4n} \right)^2 : \left(-\frac{1}{2} a^{2n} x^n \right)^3 + 2a^{2n} x^{3n} \cdot (-a^{4n} x^{2n}) \right]^2 : (-4a^{6n} x^{5n})^2} =$$

$$= \frac{3x^{2n} + 6x^n y^n - 2x^n y^n - 4y^{2n} - 3x^{2n} + 6x^n y^n - x^n y^n + 2y^{2n} - 9x^n y^n + 3y^{2n}}{\left[\left(\frac{1}{4} a^{12n} x^{8n} \right) : \left(-\frac{1}{8} a^{6n} x^{3n} \right) - 2a^{6n} x^{5n} \right]^2 : (-4a^{6n} x^{5n})^2} =$$

$$= \frac{y^{2n}}{\left[-2a^{6n} x^{5n} - 2a^{6n} x^{5n} \right]^2 : (-4a^{6n} x^{5n})^2} = \frac{y^{2n}}{(-4a^{6n} x^{5n})^2 : (-4a^{6n} x^{5n})^2} = \frac{y^{2n}}{1} = y^{2n}$$