EQUAZIONI LETTERALI

Titolo nota 03/07/2018

$ax = b \qquad a, b \in \mathbb{R}$

- $a \neq 0$

$$x = \frac{b}{a}$$

- $a = 0 \qquad \underline{ax = b}$

SOSTITUISCO $0 \cdot x = b$

$$\boxed{0 = b}$$

- se $b = 0 \Rightarrow$ sostituisco $0 = 0$ indeterminata
- se $b \neq 0 \Rightarrow b = 0$ impossibile

$$\boxed{ax = 3}$$

- se $a = 0$ $\quad 0x = 3$ impossibile
- se $a \neq 0$ $\quad x = \frac{3}{a}$ determinata

$$\boxed{ax = 0}$$

- se $a = 0$ $\quad 0 = 0$ indeterminata
- se $a \neq 0$ $\quad \frac{a}{a}x = \frac{0}{a} = 0 \Rightarrow x = 0$ determinata

$$\boxed{ax - a = a^2}$$

$$ax = a^2 + a$$

- se $a \neq 0$ $\quad x = \dfrac{a^2+a}{a} = \dfrac{a(a+1)}{a} = a+1$

- se $a = 0$ $\quad 0x = 0$ indet

$a(x-1) + x(a-1) = 1 - a$

$ax - a + ax - x = 1 - a$

$ax + ax - x = 1 \cancel{-a} \cancel{+a}$

$2ax - x = 1$

$x(2a-1) = 1$

- se $2a - 1 \neq 0$ quindi se $a \neq \frac{1}{2}$ $\Rightarrow$ $x = \frac{1}{2a-1}$
- se $a = \frac{1}{2} \Rightarrow 0x = 1$ impossibile

$$(x-a)^2-(x-2a)^2=(1+2a)^2-3a^2-4a-1$$

$$x^2+a^2-2ax-(x^2+4a^2-4ax)=1+4a^2+4a-3a^2-4a-1$$

$$\cancel{x^2}+a^2-2ax-\cancel{x^2}-4a^2+4ax=\cancel{1}+4a^2+\cancel{4a}-3a^2-\cancel{4a}-\cancel{1}$$

$$-2ax+4ax=-a^2+4a^2+4a^2-3a^2$$

$$2ax=4a^2$$

- se $2a\neq 0 \Rightarrow a\neq 0$ allora $x=\dfrac{4a^2}{2a}=2a$
- se $a=0$ allora $0x=0$ indet.

$$x+\frac{1}{2}a = x(a+1)+\frac{1}{2}(x+1)$$

$$\cancel{x}+\frac{1}{2}a = ax+\cancel{x}+\frac{1}{2}x+\frac{1}{2}$$

$$-ax-\frac{1}{2}x = -\frac{1}{2}a+\frac{1}{2}$$

moltiplico per -1

$$ax+\frac{1}{2}x = \frac{1}{2}a-\frac{1}{2}$$

$$\frac{2ax+x}{\cancel{2}} = \frac{a-1}{\cancel{2}}$$

$$x(2a+1) = a - 1$$

- se $a \neq -\frac{1}{2} \Rightarrow \quad x = \frac{a-1}{2a+1}$
- se $a = -\frac{1}{2} \Rightarrow 0x = -\frac{1}{2} - 1 \Rightarrow 0x = -\frac{3}{2}$ imp.

$$\frac{x-2a}{2} + \frac{1}{3}(a-x) = \frac{2ax-3a}{6}$$

$$\frac{x-2a}{2} + \frac{1}{3}a - \frac{1}{3}x = \frac{2ax-3a}{6}$$

$$\frac{3x-6a+2a-2x}{\cancel{6}} = \frac{2ax-3a}{\cancel{6}}$$

$$3x - 2x - 2ax = 6a - 2a - 3a$$

$$x - 2ax = a \iff x(1-2a) = a$$

· se $a \neq \frac{1}{2}$ $\quad x = \frac{a}{1-2a}$ $\qquad$ se $a = \frac{1}{2}$ $\quad 0x = \frac{1}{2}$ imp.

ESPRESSIONI

$$(a+b)^4 - (a-2b)^4 - 3b^3(12a - 5b)$$

$$a^4 + 4a^3b + 6a^2b^2 + 4ab^3 + b^4 - \left(a^4 + 4a^3(-2b) + 6a^2(-2b)^2 + 4a(-2b)^3 + (-2b)^4\right) +$$

$$-3b^3 \cdot 12a + 15b^4$$

$$\cancel{a^4} + 4a^3b + 6a^2b^2 + \cancel{4ab^3} + \cancel{b^4} - \cancel{a^4} + 8a^3b - 24a^2b^2 + \cancel{32ab^3} - \cancel{16b^4} - \cancel{36ab^3} + \cancel{15b^4}$$

$$12a^3b - 18a^2b^2$$

RIPETIZIONE SUI NUMERI PERIODICI

$$22,\overline{3} = \frac{223 - 22}{9} = \frac{201}{9}$$

$$0,\overline{29} = \frac{29 - 0}{99}$$

$$1,\overline{213} = \frac{1213 - 1}{999}$$

$$2,2\overline{3} = \frac{223 - 22}{90}$$

$$\frac{\left(3^{-2}x^2+3^{-1}x+1\right)^2}{3^{-2}} - (x+3)^2 - x^2(0,\bar{3}x-2)(0,\bar{3}x+2) - 6(-x)^2$$

$$\frac{\left(3^{-2}x^2+3^{-1}x+1\right)^2 - \frac{1}{9}(x+3)^2 - \frac{1}{9}x^2(0,\bar{3}x-2)(0,\bar{3}x+2) - \frac{1}{9}\cdot 6(-x)^2}{\frac{1}{9}}$$

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

$$\left[\cancel{\frac{1}{81}x^4} + \cancel{\frac{1}{9}x^2} + \cancel{1} + \frac{2\cdot}{27}x^3 + \cancel{\frac{2}{3}x} + \frac{2}{9}x^2 - \cancel{\frac{1}{9}x^2} - \cancel{1} - \cancel{\frac{2}{3}x} - \cancel{\frac{1}{81}x^4} + \frac{4}{9}x^2 - \frac{2}{3}x^2\right]\cdot 9$$

$$\left[\frac{2x^3 + 6\cancel{x^2} + 12\cancel{x^2} - 12\cancel{x^2}}{\cancel{27}_{\,3}}\right] \cdot \cancel{9}^{\,1}$$

$$\frac{2}{3}x^3$$

$$(x^m + x + 1)(x^m + x - 1) - (x^m - 1)(x^m + 1)$$

$$(x^m + x)^2 - 1 - (x^{2m} - 1)$$

$$\cancel{x^{2m}} + x^2 + 2x^{m+1} \cancel{-1} \cancel{-x^{2m}} \cancel{+1}$$

$$x^2 + 2x^{m+1}$$

RICORDA:

Gli esponenti si sommano!

$$x^m \cdot x = x^{m+1}$$

$$x^m \cdot x^m = x^{m+m} = x^{2m}$$

$$\underline{(a^{m+1} - a^m)^2} - \underline{(a^{m+1} + a^m)}^2 + (a^{2m} + 2a)^2 - [(a^m)^2]^2$$

$$-\cancel{2a}^{2m+1} - \cancel{2a}^{2m+1} + \cancel{a}^{4m} + 4a^2 + \cancel{4a}^{2m+1} - \cancel{a}^{4m}$$

$$\boxed{a^{2m} \cdot a = a^{2m+1}}$$

EQUAZIONI DI 1° GRADO

$$(x+2y)(x-2y)-2(x+2y)^2=4y^2-(x+4y)^2$$

$$x^2-4y^2-2x^2-8y^2-8xy=4y^2-x^2-16y^2-8xy$$

$$-x^2-12y^2-8xy=-12y^2-x^2-8xy \quad V$$

In questo esercizio viene richiesto di verificare l'uguaglianza fra i membri dell'equazione

DATO:

$P(x) = x^2 - 1$,

Calcolare $P(a+1) - P(a-1)$

Calcolo dapprima $P(a+1)$ sostituendo ad $x \rightarrow a+1$

$P(x = a+1) = (a+1)^2 - 1 = a^2 + 1 + 2a - 1 = a^2 + 2a$

Calcolo $P(a-1)$ sostituendo ad $x \rightarrow a-1$

$P(x = a-1) = (a-1)^2 - 1 = a^2 + 1 - 2a - 1 = a^2 - 2a$

Infine calcoliamo:

$P(a+1) - P(a-1) = a^2 + 2a - a^2 + 2a = 4a$