Serie 10 **Tecnica di calcolo.** **29 marzo 2023**

1) Scomponi in fattori i seguenti polinomi.

250 $a^2+8a+15$; $a^2+4a-21$; $a^2-14a+48$; $-x^2+7x-12$.

251 $-x^2+4x+5$; a^2+a-20; $y^2+3y-40$; b^2+2b-8.

252 $x^2+21x+80$; $x^2-5x-14$; a^4-a^2-20; x^4+x^2-2.

253 x^6+5x^3-14; $-y^6+7y^3-10$; $x^2-6ax-16a^2$; $2x^2+7x+3$.

254 $z^2-7x^3z+6x^6$; $a^2-2ab-3b^2$; $3x^2-7x+2$; $4x^2+3x-1$.

255 $x^2-4ax-12a^2$; $5x^2-13x-6$; $2x^8-x^4-1$; $3x^4+x^2-2$.

2) Semplifica le seguenti frazioni algebriche.

232 $\left(\frac{3a^2b^3}{4c^4}\right)^2$; $\left(-\frac{2xy^2}{3z^3}\right)^3$. $\left[\frac{9a^4b^6}{16c^8};-\frac{8x^3y^6}{27z^9}\right]$

233 $\left(-\frac{27a^4b^5c^8}{9a^2b^6c^5}\right)^2$; $\left(\frac{6x^3y^2z}{12xy^5z^7}\right)^3$. $\left[\frac{9a^4c^6}{b^2};\frac{x^6}{8y^9z^{18}}\right]$

234 $\left(\frac{2a+2b}{a^2+2ab+b^2}\right)^3$; $\left(\frac{4a^2-4b^2}{2b-2a}\right)^3$. $\left[\frac{8}{(a+b)^3};-8(a+b)^3\right]$

235 $\left(x-\frac{xy}{x+y}\right)^3$; $\left[2pq^3\cdot\left(-\frac{1}{2p^2q}\right)\right]^5$. $\left[\frac{x^6}{(x+y)^3};-\frac{q^{10}}{p^5}\right]$

3) Semplifica le seguenti frazioni algebriche.

3 $\frac{30a^2x}{5ax^2}$; $\frac{2x^2+x}{2ax+a}$; $\frac{6b^3}{3ab^2-3b^3}$. $\left[\frac{6a}{x};\frac{x}{a};\frac{2b}{a-b}\right]$

4 $\frac{x^2-x}{ax-a}$; $\frac{4a^2b^2}{2a^2b^2-2ab}$; $\frac{y^2-4}{y^2+4y+4}$. $\left[\frac{x}{a};\frac{2ab}{ab-1};\frac{y-2}{y+2}\right]$

5 $\frac{16x^2-9y^2}{8x^2-6xy}$; $\frac{a^2+2a+1}{a^2+4a+3}$; $\frac{a^2b+9b-6ab}{a^2b-9b}$. $\left[\frac{4x+3y}{2x};\frac{a+1}{a+3};\frac{a-3}{a+3}\right]$

6 $\frac{a^2-a-6}{a^2-2a-8}$; $\frac{a^2-4ay+ax}{-4xy+x^2+ax}$; $\frac{x^2-10x+25}{x^2-8x+15}$. $\left[\frac{a-3}{a-4};\frac{a}{x};\frac{x-5}{x-3}\right]$

7 $\frac{36x^2-4}{36x^3-24x^2+4x}$; $\frac{x^2+a^2+1+2ax+2x+2a}{x^2-a^2-2a-1}$. $\left[\frac{3x+1}{x(3x-1)};\frac{x+a+1}{x-a-1}\right]$

4) Equazioni parametriche

Equazione	Se	Soluzione	Se	Soluzione
$ax+1=0$	$a\neq 0$	$x=\frac{-1}{a}$	$a=0$	impossibile
$(a+1)x=0$				
$(a-1)x=a$				
$(a-2)x=a-2$				
$2ax=a^2-a$				

5) Risolvi e discuti le seguenti equazioni letterali

503 $bx+b=0$ $[b\neq 0,\ x=-1;\ b=0,\ \text{indet.}]$

504 $ax-3a^2=0$ $[a\neq 0,\ x=3a;\ a=0,\ \text{indet.}]$

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$(b^2-2b-3)x=b^2-3b-4$

506 $ax=x+a$ $\left[a\neq 1,\ x=\frac{a}{a-1};\ a=1,\ \text{imp.}\right]$

507 $bx-2=0$ $\left[b\neq 0,\ x=\frac{2}{b};\ b=0,\ \text{imp.}\right]$

508 $2ax-a=0$ $\left[a\neq 0,\ x=\frac{1}{2};\ a=0,\ \text{indet.}\right]$

509 $ax+2-a=0$ $\left[a\neq 0,\ x=\frac{a-2}{a};\ a=0,\ \text{imp.}\right]$

510 $2a-3x=7a-5x$ $\left[x=\frac{5a}{2}\right]$

511 $b(x-2)+b+1=0$ $\left[b\neq 0,\ x=\frac{b-1}{b};\ b=0,\ \text{imp.}\right]$

512 $6x-3(x+2a)=a+4(x-2a)$ $[x=a]$

513 $ax=ab$ $[a\neq 0,\ x=b;\ a=0,\ \text{indet.}]$

514 $2x-4(3x-a)=6(a-2x)+6a$ $[x=4a]$

515 $(a+1)x=3$ $\left[a\neq -1,\ x=\frac{3}{a+1};\ a=-1,\ \text{imp.}\right]$

516 $ax+2x=2a+4$ $[a\neq -2,\ x=2;\ a=-2,\ \text{indet.}]$

6) Risolvi le seguenti equazioni.

17 $x(x+1)-2(x+4)(x-3)+2x=(2-x)(x+1)$ [impossibile]

18 $(6x-1)^2+70x-11(x+2)^2=(5x+2)^2-7x$ [47]

19 $\frac{2(x-1)(x^2+x+1)}{5}=3-2x+\frac{(x^2-x+1)(x+1)}{3}+\frac{x^3-11}{15}$ $\left[\frac{3}{2}\right]$

20 $\frac{x}{3}+\frac{1}{2}=\left[\frac{1-x}{3}+\left(\frac{x}{3}+\frac{2-6x}{3}\right)-\frac{x+1}{2}\right]+\frac{1}{3}x$ [0]

21 $x(1-2x)-\left(\frac{4x+2}{2}\right)(1-x)+2\left[3\left(x-\frac{1}{3}\right)-\frac{2x+1}{2}\right]=4x-4$ [indeterminata]

7) Risolvi le seguenti equazioni numeriche fratte.

30 $\frac{4}{x+1}=\frac{2}{x}$ [1]

31 $\frac{2-x}{3x+6}+\frac{1-3x}{2+x}=2$ $\left[-\frac{7}{16}\right]$

32 $\frac{x+3}{x-3}-\frac{x-3}{x+3}=\frac{5x}{x^2-9}$ [0]

33 $1+\frac{x+1}{x-2}=\frac{2(x^2+2)}{x^2-4}$ [impossibile]

34 $\frac{1}{x^2+2x-3}+\frac{1}{(x-2)\cdot(x+3)}=\frac{1}{x^2-3x+2}$ [6]

35 $\frac{(x-1)^3+8}{x^2+7x+6}-x+1=\frac{-9x+67}{x}$ [impossibile]

36 $\left(\frac{x+1}{x-1}-\frac{x-1}{x+1}\right):\left(\frac{x-1}{x+1}+\frac{x+1}{x-1}\right)=\frac{2x}{x^2+1}$ $[\forall x\neq\pm 1]$