Utilizza i prodotti notevoli per semplificare le seguenti espressioni.

$(x+y)^2-(x-y)(x+y)-2y^2$ $[2xy]$

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

$(x^2-3)^2+(x^2-3)(x^2+3)-2x^2(x^2+3)$ $[-12x^2]$

$\left(\frac{1}{2}x^2-\frac{1}{3}y\right)\left(\frac{1}{2}x^2+\frac{1}{3}y\right)+\left(\frac{3}{4}x^2-\frac{2}{3}y\right)^2-\frac{1}{3}y^2+x^2y$ $\left[\frac{13}{16}x^4\right]$

$(xy+x+1)^2-xy(xy+2x)-x(2y+x+2)$ $[1]$

$\left(\frac{1}{2}x+3y\right)^3-\left(3y-\frac{1}{2}x\right)^3-27xy^2-\frac{1}{4}x^3$ $[0]$

$3(a+b+1)^2-2(a+1)^3+(2a^3-3b^2)$ $[1-3a^2+6ab+6b]$

$x(x^2+3)-(x+1)^3+(x-1)(x+1)$ $[-2x^2-2]$

$[(x+y)^3-(x-y)(x^2+y^2+xy)-3xy(x+y)]^2-(2y^2)^3$ $[-4y^6]$

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

$10[(2x-2x^2)^2-x-(1-2x^2)(2x^2+1)]+(-2x)^5+(2x-1)^5$ $[-11]$

Esegui le seguenti divisioni, determinando quoziente e resto.

$(2x^5-5x-x^3-4):(x^2-2x+1)$ $[Q=2x^3+4x^2+5x+6;\ R=2x-10]$

$\left(\frac{2}{3}x^4-\frac{1}{2}x^3+3x-2\right):(2x^2-1)$ $\left[Q=\frac{1}{3}x^2-\frac{1}{4}x+\frac{1}{6};\ R=\frac{11}{4}x-\frac{11}{6}\right]$

$\left(2x^{n+4}-\frac{1}{4}x^{n+2}\right):(2x^n-1)$ (con $n\in\mathbb{N}$) $\left[Q=x^4-\frac{1}{8}x^2;\ R=x^4-\frac{1}{8}x^2\right]$

Esegui le seguenti divisioni, determinando quoziente e resto mediante la regola di Ruffini.

$(x^2-x+3-2x^3):(x-1)$ $[Q=-2x^2-x-2;\ R=1]$

$(b^4-3b^2+2):(b-2)$ $[Q=b^3+2b^2+b+2;\ R=6]$

$(3y^2-22+5y):(3y+11)$ $[Q=y-2;\ R=0]$

$(12x^4+5x^3+2x+1):(2x+1)$ $\left[Q=6x^3-\frac{1}{2}x^2+\frac{1}{4}x+\frac{7}{8};\ R=\frac{1}{8}\right]$

Per ogni polinomio calcola il valore che assume sostituendo alla variabile i valori scritti a fianco.

$P(x) = 3x^2 + 4x - 1 \qquad x = 0, \quad x = 1, \quad x = -2.$

$Q(x) = \frac{4}{3}x^2 - \frac{1}{2}x + 4 \qquad x = \frac{3}{2}, \quad x = 2, \quad x = -\frac{1}{2}.$

$R(x) = \frac{2}{3}x^3 - \frac{1}{2}x^2 + 3x \qquad x = 0, \quad x = -1, \quad x = -\frac{1}{2}.$

Determina il resto senza eseguire la divisione.

$(2x^3 + 4x^2 + 3x - 1) : (x + 2)$ $[R = -7]$

$\left(x^3 + \frac{4}{3}x^2 - 2x + 1\right) : \left(x - \frac{2}{3}\right)$ $\left[R = \frac{5}{9}\right]$

$\left(\frac{1}{3}x^4 - \frac{2}{3}x^3 - 4x - 1\right) : (x + 1)$ $[R = 4]$

$(a^4 - 4a^3 - 2a^2 + 3a) : (a - 2)$ $[R = -18]$

Scomponi in fattori i seguenti polinomi ($n \in \mathbb{N}$).

$\frac{1}{4}x^4y^4 - \frac{4}{9}$; $\quad 4a^2b + a^4 + 4b^2$; $\quad x^2 + 4z^2 + y^2 + 2xy - 4xz - 4zy$.

$x^3 - 6x^2 + 12x - 8$; $\quad \frac{1}{729}y^6 - x^6z^6$; $\quad x^2 - 2x - 15$.

$2a^5x^4 - 32a$; $\quad x^3 + x^2 - 17x + 15$; $\quad x^3 - 4xy^2 + 3x^2 - 12y^2$.

$[2a(ax-2)(ax+2)(a^2x^2+4); (x-1)(x-3)(x+5); (x+3)(x-2y)(x+2y)]$

$2x^2y + 16xy + 32y$; $\quad 2x + 6y + ax + 3ay$; $\quad x^3(x+1) - y^3(x+1)$.

$[2y(x+4)^2; (2+a)(x+3y); (x+1)(x-y)(x^2+xy+y^2)]$

$3x^2y + 18xy^2 + 27y^3$; $\quad 8a^3 + \frac{1}{27}a^3b^3 + 4a^3b + \frac{2}{3}a^3b^2$; $\quad x^6 - 3x^4y^2 + 3x^2y^4 - y^6$.

$\left[3y(x+3y)^2; a^3\left(2+\frac{1}{3}b\right)^3; (x+y)^3(x-y)^3\right]$

$2x^4 + 54x$; $\quad a^3 + 6a^2 - 7a$; $\quad 4a^3 + ax^2 + 4a^2x$. $\quad [2x(x+3)(x^2-3x+9); a(a-1)(a+7); a(2a+x)^2]$

$\frac{3}{4}b^3 - 3bx^2$; $\quad 3b^3 - 3b^2 - 27b + 27$; $\quad 2x^2 + 2x - 40$.

$\left[3b\left(\frac{1}{2}b - x\right)\left(\frac{1}{2}b + x\right); 3(b-3)(b+3)(b-1); 2(x+5)(x-4)\right]$

$4x^2 - 4x - 8$; $\quad 2x^5 + 16x^3 + 32x$; $\quad 1250a^2 - 2a^2x^4$.

$[4(x+1)(x-2); 2x(x^2+4)^2; 2a^2(5+x)(5-x)(25+x^2)]$

$a^3 - 5a^2 - 24a$; $\quad -2x^4 + 12x^3 - 24x^2 + 16x$; $\quad (x^2+4)^2 - 16x^2$.

$[a(a+3)(a-8); 2x(2-x)^3; (x-2)^2(x+2)^2]$

$a^4 + b^4 - 2a^2b^2 - c^4 + a^2 - b^2 + c^2$; $\quad 4x^2 + 12x - 4y^2 - 12y$; $\quad x^8 + 64$.

$[(a^2-b^2+c^2)(a^2-b^2-c^2+1); 4(x-y)(x+y+3); (x^4-4x^2+8)(x^4+4x^2+8)]$

$t^4+t^2y+y^2+t^6-y^3;$ $\quad 3c^2-27d^2-12c+12;$ $\quad a^2+2ax-a+x^2-x.$

$[(t^4+t^2y+y^2)(t^2-y+1);\ 3(c+3d-2)(c-3d-2);\ (a+x)(a+x-1)]$

$a^2-b^2+b-\frac{1}{4};$ $\quad 3a^2-3b^2+a^2x-2abx+b^2x;$ $\quad 3by^2+27b-18by.$

$\left[\left(a-b+\frac{1}{2}\right)\left(a+b-\frac{1}{2}\right);\ (a-b)(3a+3b+ax-bx);\ 3b(y-3)^2\right]$

$x^4+2x^3+27x+54;$ $\quad (2x+ab)^2+(bx-2a)^2;$ $\quad a^6-2a^4+a^2.$

$[(x+2)(x+3)(x^2-3x+9);\ (a^2+x^2)(b^2+4);\ a^2(a-1)^2(a+1)^2]$

$4a^3-4ax^2+8a^2+8ax;$ $\quad (a^2-2)^2-a^4;$ $\quad a^2b-9b-a-3.$

$[4a(a+x)(a-x+2);\ -4(a-1)(a+1);\ (a+3)(ab-3b-1)]$

$27x^3+9x^2-3xy^2-y^2;$ $\quad x^3-4x^2-19x-14;$ $\quad 3x^2y-6xy^3-9xy.$

$[(3x+1)(3x-y)(3x+y);\ (x+1)(x+2)(x-7);\ 3xy(x-2y^2-3)]$

$4^{2n+1}-2^{2n+3}+4;$ $\quad 9a^{2n+2}-a^2-9a^{2n}b^2+b^2.$ $\quad [4(2^n-1)^2(2^n+1)^2;\ (3a^n-1)(3a^n+1)(a-b)(a+b)]$

Calcola il MCD e il mcm dei seguenti polinomi.

$x^4-x^3-6x^2;$ $\quad x^4+8x;$ $\quad x^3+4x^2+4x.$ $\quad [\mathrm{MCD}=x(x+2);\ \mathrm{mcm}=x^2(x-3)(x+2)^2(x^2-2x+4)]$

$a^3-2a+1;$ $\quad a^4-2a^2+1;$ $\quad a^4+a^3-a^2.$ $\quad [\mathrm{MCD}=1;\ \mathrm{mcm}=a^2(a-1)^2(a+1)^2(a^2+a-1)]$

$b^2-7b+6;$ $\quad ab-2b+4a-8;$ $\quad b^3+2b^2-7b+4.$ $\quad [\mathrm{MCD}=1;\ \mathrm{mcm}=(b-6)(b-1)^2(b+4)(a-2)]$

Semplifica le seguenti espressioni dopo aver determinato le condizioni di esistenza.

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

$$\left(\frac{a-1}{a+1}-\frac{2a^2}{a^2-1}-\frac{a+1}{1-a}\right)\cdot\left(1-\frac{1}{a^2}\right):\left(1+\frac{a}{2-a}\right)\qquad\left[\frac{2-a}{a^2}\right]$$

$$\frac{1}{x^2+2xy+y^2}-\frac{1}{x^2-y^2}+\frac{2y}{(x+y)^2(x-y)}\qquad[0]$$

$$\frac{2}{b^2-b-2}+\frac{1}{b^2+3b+2}+\frac{1}{b^3+b^2-4b-4}\qquad\left[\frac{3}{b^2-4}\right]$$

$$\left(\frac{a^2}{4a^2+4ab+b^2}-\frac{a-b}{6a+3b}\right):\frac{a^3-b^3}{12a+6b}\qquad\left[\frac{2}{(a-b)(2a+b)}\right]$$

$$\left(\frac{2}{a-2}-\frac{2}{a+3}-\frac{5a}{a^2+a-6}\right)\cdot\left(1+\frac{3}{a}\right)\qquad\left[-\frac{5}{a}\right]$$

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

$$\frac{1+\dfrac{2}{x-1}}{\dfrac{x^2+x}{2x-2}};\qquad\frac{\dfrac{x^3+1+3x^2+3x}{x^2+5x}}{1+\dfrac{2}{x}+\dfrac{1}{x^2}}\qquad\left[\frac{2}{x};\ \frac{x^2+x}{x+5}\right]$$

Risolvi le seguenti equazioni numeriche intere.

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

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

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

$$\frac{7}{20}x+\frac{x-2}{15}+\frac{1}{12}x^2=\frac{1}{12}(x+3)^2-\frac{1}{20}(2x+3)$$ [44]

$$8x+20+(x-2)^3-x^2(x-6)=x-10+18(x+2)$$ [14]

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

$$3\cdot(x-1)^2-2\cdot[(x-2)\cdot(x+2)-2x]=(3-x)^2-3\cdot(2x-1)$$ $\left[\frac{1}{10}\right]$

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

$$(5-3x)(3x+5)x-\frac{1}{3}(1-3x)(9x^2+3x+1)+(2x-3)(9+6x)-\frac{1}{3}=(4x-1)^2-14-x(4x-11) \qquad \left[\frac{2}{3}\right]$$

Risolvi le seguenti equazioni numeriche fratte.

$$\frac{3x+1}{2x+4}-\frac{9x+1}{3x-1}=\frac{2x+1}{x+2}+\frac{-3x-6}{6x-2}-3 \qquad \left[\frac{3}{2}\right]$$

$$\frac{3x}{x^2-4}-\frac{x+1}{3x}+\frac{x-3}{2-x}=\frac{x+5}{3x+6}-\frac{5x^3-8x^2+4}{3x^3-12x} \qquad \left[-\frac{1}{4}\right]$$

$$\frac{2x^3+4x^2-6}{3x-3x^2+x^3-1}-\frac{7x-1}{x^2+1-2x}=\frac{3}{x-1}+2 \qquad [\text{impossibile}]$$

$$\left(\frac{x^3-5x^2}{x^2-7x+10}-x-2\right)\left(2-\frac{2}{x+1}\right)=x(x+1)^{-1}-1 \qquad \left[\frac{2}{9}\right]$$

$$\frac{1}{x^2-x}:\frac{x+3}{2x^2+7x+3}=\left(\frac{2x}{x^4-1}:\frac{2}{x^3-x^2+x-1}+\frac{x-1}{x+1}\right):x \qquad [\text{impossibile}]$$

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

Risolvi le seguenti equazioni letterali nell'incognita *x*.

$$a^2x-ax-a+1=0 \qquad \left[a\neq 1 \wedge a\neq 0, x=\frac{1}{a}; a=1, \text{indeterminata}; a=0, \text{impossibile}\right]$$

$$3x(a+1)+3(a+1)-2(x+1)=-(3a-1)(3a+1) \qquad \left[a\neq -\frac{1}{3}, x=-3a; a=-\frac{1}{3}, \text{indeterminata}\right]$$

$$(x-1)\cdot(a+1)-(2x-1)\cdot(a-1)=2 \qquad \left[a\neq 3, x=\frac{4}{3-a}; a=3, \text{impossibile}\right]$$

$$\frac{x}{a}-\frac{x-1}{2}=\frac{1-x}{1-a}+\frac{1-a}{2} \qquad [a\neq 0 \wedge a\neq 1, x=a]$$

$$\frac{3x+a}{a^2-4}+\frac{6x}{a-2}=\frac{5x}{a+2} \qquad \left[a\neq 2 \wedge a\neq -2 \wedge a\neq -25, x=\frac{-a}{a+25}; a=-25, \text{impossible}\right]$$

$$\frac{x+1}{1-b}-\frac{x+b}{1+b}=\frac{b(x-b)}{1-b}-\frac{x-1}{1+b} \qquad \left[b\neq\pm 1, x=\frac{b(b+1)}{b-1}\right]$$

$$\frac{b}{x^2-x}+\frac{2-3b}{x}=\frac{1-b}{1-x} \qquad \left[b\neq\frac{3}{4} \wedge b\neq\frac{1}{2}, x=\frac{2-4b}{3-4b}; b=\frac{3}{4}\vee b=\frac{1}{2}, \text{impossibile}\right]$$

$$\frac{x}{x-2a}-\frac{x^2}{x^2-4a^2}=-\frac{2a}{x+2a} \qquad [a\neq 0, x=a; a=0, \text{indeterminata con } x\neq 0]$$

$$\frac{3x}{3-a}=\frac{a-x+2}{3a-a^2}-\frac{x}{a} \qquad \left[a\neq -2 \wedge a\neq 0 \wedge a\neq 3, x=\frac{1}{2}; a=-2, \text{indeterminata}\right]$$

Risolvi le seguenti disequazioni numeriche intere.

$$\frac{4}{3}\left(x+\frac{1}{3}\right) > 3\left(x+\frac{1}{3}\right)-\frac{1}{3}\left(5x-\frac{1}{3}\right)$$ [impossibile]

$$\frac{1-2x}{3}+\frac{1}{2} < 2x+\frac{1}{3}\left(1-\frac{x}{2}\right)+8$$ $[x>-3]$

$$\frac{(3x-1)^2}{3}+\frac{x+3}{6} > 3x(x-1)-\frac{2-7x}{4}$$ $\left[x<\frac{16}{7}\right]$

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

$$2x\left(x-\frac{2}{9}x\right)-\frac{x}{3}\left(\frac{10}{3}x+4\right) < \left(1-\frac{2}{3}x\right)^2$$ $[\forall x \in \mathbb{R}]$

$$\frac{(x-2)^2}{4}-\left[\frac{1-x}{2}-\left(\frac{1}{4}x-1\right)\right]+\frac{(3-x)(3+x)}{4} > 0$$ $[x<7]$

$$\frac{1}{4}+(x-1)\left(x-\frac{1}{4}\right) \leq \left(x+\frac{1}{2}\right)^2-\frac{3}{16}\left[2x+\frac{4(x-2)}{3}\right]$$ $\left[x\geq-\frac{2}{13}\right]$

$$(3x-1)^2+4(x-2)(x+2)-2(3-5x)(1+x) \geq 5(-1-2x)(1-2x)+3(x-4)^2-42$$ $[x\geq 1]$

Risolvi i seguenti sistemi di disequazioni.

$$\begin{cases}(2x-1)^2<2(2x+1)(x-3)\\(x-1)(x+1)>2+x^2-2(x-1)\end{cases}$$ [impossibile]

$$\begin{cases}(x+1)^2+2(x^2-2)\leq 3(x+1)(x-1)\\2x(x-3)+(x+2)^2>5+3x^2\end{cases}$$ $\left[x<-\frac{1}{2}\right]$

$$\begin{cases}\dfrac{4(x-1)}{3}-2x(x-1)\geq -2(x^2+3)\\\dfrac{2}{3}x-(1-x)(1+x)\leq x^2+1\end{cases}$$ $\left[-\frac{7}{5}\leq x\leq 3\right]$

$$\begin{cases}(x+3)(x-2)<(x+1)^2+1\\\dfrac{3x-1}{9}-\dfrac{6x-2}{6}+\dfrac{3x-1}{6}>x-\dfrac{1}{3}\end{cases}$$ $\left[-8<x<\frac{1}{3}\right]$

$$\begin{cases}\dfrac{(a+1)(a-2)}{3}\leq\dfrac{(2a+1)^2}{12}\\(3a+1)\dfrac{1}{6}a>2\left(\dfrac{1}{4}a^2+1\right)\end{cases}$$ $[a>12]$

$$\begin{cases}(a+1)(a-2)\leq a^2+1\\7a+5(a-3)<12a\end{cases}$$ $[a\geq -3]$

$$\begin{cases}\dfrac{1}{3}+\dfrac{3-4x}{2}<\dfrac{5x-4}{6}+\dfrac{x-5}{2}\\\dfrac{7(x-2)}{6}+\dfrac{5(3x-2)}{4}-\dfrac{1}{2}(4x+1)<\dfrac{11}{12}x-\dfrac{2(x+4)}{3}\end{cases}$$ [impossibile]

$$\begin{cases}x^2-1-\dfrac{2x+11}{6}\geq\dfrac{(3-2x)^2-1}{4}\\\dfrac{(2x-1)^3+(6x-1)(2x+3)}{4}-\dfrac{40x-5}{6}\leq\dfrac{1-2x}{3}+\dfrac{2x(3x^2-1)}{3}\end{cases}$$ $\left[\frac{29}{16}\leq x\leq 3\right]$

$$\begin{cases}(2x+3)(1-2x)+2x(2-x)+6(x-3)^2+15>0\\\dfrac{x-1}{3}-\dfrac{2}{3}x-4(2-3x)\leq\dfrac{1}{3}(1-4x)\\\dfrac{1}{2}(3-2x)^2+(2+x)(-2-x)\leq\dfrac{(5+2x)x}{2}\end{cases}$$ $\left[\frac{1}{25}\leq x\leq\frac{2}{3}\right]$

Risolvi le seguenti disequazioni letterali nell'incognita x.

$\frac{1}{2}x-a(2-x)>a\left(-x-\frac{1}{2}\right)$ $\left[a>-\frac{1}{4}, x>\frac{3a}{1+4a}; a<-\frac{1}{4}, x<\frac{3a}{1+4a}; a=-\frac{1}{4}, \forall x\in\mathbb{R}\right]$

$(x+a)^2-b^2\leq(x+b)(x-b)-a^2$ $[a>0, x\leq -a; a<0, x\geq -a; a=0, \forall x\in\mathbb{R}]$

$(1+a)x-3<ax-3a-a(2x-1)$ $\left[a>-\frac{1}{2}, x<\frac{3-2a}{1+2a}; a<-\frac{1}{2}, x>\frac{3-2a}{1+2a}; a=-\frac{1}{2}; \forall x\in\mathbb{R}\right]$

$\frac{2-a}{2x+a}>0$ $\left[a<2\text{: } x>-\frac{a}{2}; a>2\text{: } x<-\frac{a}{2}; a=2\text{: imp.}\right]$

$\frac{x-a}{bx}>\frac{x-b}{ax}$, con $a>0$ e $b>0$ $[a>b, x<0\vee x>a+b; a<b, 0<x<a+b; a=b, \text{imp.}]$

Risolvi i seguenti sistemi di disequazioni letterali nell'incognita *x*.

$\begin{cases} 2(a-2)x-2a>2(1-a)-4x \\ 3x+2(a-1)<3(a+1)x+2a \end{cases}$ $\left[a<0,\ x<\frac{1}{a};\ a=0, \text{ impossibile};\ a>0,\ x>\frac{1}{a}\right]$

$\begin{cases} 2x-3a \geq x+8a \\ 3x-8a<10a+2x+3a \end{cases}$ $[a \leq 0, \text{ impossibile};\ a>0,\ 11a \leq x<21a]$

Risolvi le seguenti equazioni e disequazioni con valori assoluti.

$|x|+5=2x+1$ $[x=4]$

$|x-1|=3x+1$ $[x=0]$

$2+x-|2+x|=0$ $[x \geq -2]$

$\left|x-\frac{1}{3}\right|-|2x+1|-1=0$ [impossibile]

$\frac{1}{2}+|x| \geq 2x-3$ $\left[x \leq \frac{7}{2}\right]$

$|x-2| \leq 2x+5$ $[x \geq -1]$

$|x+3|>3x+\frac{1}{2}$ $\left[x<\frac{5}{4}\right]$

$\frac{|3x|+1}{2x+1}-\frac{12x-|3x|}{4x+2}>-3$ $\left[x>-\frac{1}{2}\right]$

Risolvi le seguenti disequazioni numeriche fratte.

$\frac{2x+1}{x-5}<0$ $\left[-\frac{1}{2}<x<5\right]$

$\frac{3-2x}{x+3}>0$ $\left[-3<x<\frac{3}{2}\right]$

$\frac{3x-6}{x+3} \geq \frac{1}{2}$ $[x<-3 \vee x \geq 3]$

$\frac{(x-3)(x+6)-(x-8)}{x+4} \geq x+1$ $\left[-\frac{14}{3} \leq x<-4\right]$

$\frac{4}{x-3} \geq 2-\frac{5x-4}{x-3}$ $[x \leq -2 \vee x>3]$

$\frac{x-2}{2x+1}+\frac{2}{4x+2} \geq 0$ $\left[\left]-\infty;-\frac{1}{2}\right[\cup [1;+\infty[\right]$

$\frac{4x}{1-x}>\frac{2}{x-1}-2$ $[-2<x<1]$

$\frac{12+x(7+x)}{x^2+2x-3}+\frac{2x-1}{1-x} \leq 1$ $[(x<1 \vee x \geq 3) \wedge x \neq -3]$

Risolvi i seguenti sistemi di disequazioni.

$\begin{cases} \frac{x+3}{2-x}>0 \\ -3x-9 \leq 0 \end{cases}$ $[-3<x<2]$

$\begin{cases} (x+3)(2-x) \leq 0 \\ \frac{x-4}{2x}>0 \end{cases}$ $[x \leq -3 \vee x>4]$

$\begin{cases} \frac{2-x}{x+3} \geq 1 \\ 8-x(x+1)<(2-x)(2+x)+6 \end{cases}$ $\left[-2<x \leq -\frac{1}{2}\right]$

$\begin{cases} \frac{1-4x}{2x+1}>\frac{1}{2} \\ \frac{x}{3x+5}>1 \end{cases}$ [impossibile]