Frazioni algebriche

Semplifica le seguenti frazioni algebriche, dopo aver stabilito le condizioni di esistenza.

1. $\frac{xy-3y}{2x-6}$

$\left[\frac{y}{2} \quad - \quad C.E.: x \neq 3\right]$

2. $\frac{x-1}{x^2-1}$

$\left[\frac{1}{x+1} \quad - \quad C.E.: x \neq \pm 1\right]$

3. $\frac{4x^6y^5z^3}{3x^5y^2z}$

$\left[\frac{4}{3}xy^3z^2 \quad - \quad C.E.: x, y, z \neq 0\right]$

4. $\frac{-5a^7(-2)b^5c^3d}{abc(-1)abcd}$

$\left[\frac{10a^5b^3c^2}{c(-1)} \quad - \quad C.E.: a, b, c, d \neq 0\right]$

5. $\frac{3}{2x}+\frac{2}{4x}-\frac{1}{3x}$

$\left[\frac{5}{3x} \quad - \quad C.E.: x \neq 0\right]$

6. $\frac{7}{6a}+\frac{4}{9a}+\frac{7}{18a}$

$\left[\frac{2}{a} \quad - \quad C.E.: a \neq 0\right]$

7. $\frac{2x-1}{2}+\frac{x}{2}+\frac{x^2-1}{x-1}$

$\left[\frac{5x+1}{2} \quad - \quad C.E.: x \neq 1\right]$

8. $-5x+\frac{2x+1}{x}-\frac{x+2}{2x}$

$\left[\frac{3-10x}{2} \quad - \quad C.E.: x \neq 0\right]$

9. $\frac{2}{3}-\frac{2x}{3(x-1)}+\frac{1}{x+1}$

$\left[\frac{x-5}{3(x^2-1)} \quad - \quad C.E.: x \neq \pm 1\right]$

10. $\dfrac{\frac{1}{7}x^2+\frac{2}{7}x-\frac{9}{112}}{x+\frac{9}{4}}\cdot\dfrac{x}{x-\frac{1}{4}}-\frac{2x-7}{14}$

$\left[\frac{1}{2} \quad - \quad C.E.: x\neq\frac{1}{4}, x\neq-\frac{9}{4}\right]$

11. $\dfrac{x+2}{x+7}-\dfrac{2x}{7(x-1)}+\dfrac{\frac{2}{7}x^2+4x+23}{x^2+6x-7}-\dfrac{3}{x-1}$

$\left[\frac{x^2}{x^2+6x-7} \quad - \quad C.E.: x\neq 1, x\neq -7\right]$

12. $\dfrac{a+b}{a-b}+\dfrac{b(b-6a)y}{(a+b)(a-b)}+\dfrac{2b}{a+b}+\dfrac{2a}{a-b}$

$\left[\frac{3a^2+6ab-b^2-6aby-b^2y}{(a+b)(a-b)} \quad - \quad C.E.: a\neq\pm b\right]$

13. $\dfrac{t^2+5t-6}{t^2-t}-\dfrac{t^2-4t+36}{t^2-3t}-\dfrac{7}{t}$

$\left[-\frac{33}{(t-3)t} \quad - \quad C.E.: t\neq 0, t\neq 1, t\neq 3\right]$

14. $\left[\dfrac{a-b}{a+b}+\dfrac{ab-1-b^2-(a+1)(a-1)}{a^2-b^2}+\dfrac{a}{a-b}\right]\cdot\dfrac{(a+b)(a-b)}{a}$

$[a \quad - \quad C.E.: a\neq 0, a\neq\pm b]$

15. $\dfrac{1+x}{2-4x}-\dfrac{1}{2x+1}\dfrac{x+1}{2x-1}+\left(-\dfrac{x+\frac{1}{2}}{2x-1}+\dfrac{x}{x-\frac{1}{2}}\right)\cdot\dfrac{2x^2+5x+3}{4x^2-1}$

$[0 \quad - \quad C.E.: x\neq\pm\frac{1}{2}]$

16. $\dfrac{1+3xy}{3x^2-xy}+\dfrac{y}{x}+\dfrac{x}{3x-y}-\dfrac{3x(1+y^2)-y(y+1)(y-1)}{x(9x^2-y^2)}$

$\left[\frac{x(19y+3x)}{(3x+y)(3x-y)} \quad - \quad C.E.: x\neq 0, x\neq\pm y\right]$

17. $-\dfrac{2a-b}{a+b}\cdot\left(\dfrac{b}{a-b}+a\right)-\dfrac{ab(2b-6)}{a^2-b^2}+\dfrac{a-b}{a+b}-\dfrac{a+b}{a-b}+\dfrac{2a^3-b^2}{a^2-b^2}$

$\left[\frac{3ab}{a+b} \quad - \quad C.E.: a\neq\pm b\right]$

18. $\dfrac{3x+2y}{x+2y}+\dfrac{xy}{x-2y}+\dfrac{y}{x}-\dfrac{y(2-3x-4y)}{x^2-4y^2}+\dfrac{2xy-3x^3+4y^3}{x^3-4xy^2}$

$\left[\frac{xy}{x-2y} \quad - \quad C.E.: x\neq 0, x\neq\pm 2y\right]$

19. $\left(\dfrac{2}{x^2-4x+4}+\dfrac{3}{x^2+4x+4}-\dfrac{5}{x^2-4}\right):\dfrac{4(4-x)}{(x^2-4)^2}$

$\left[\frac{x-10}{x-4} \quad - \quad C.E.: x\neq\pm 2\right]$

20. $\left[\dfrac{1}{x^2-x+1}\dfrac{\left(x-\frac{x}{x+1}\right)^2}{\left(x+\frac{x}{x+1}\right)^2}:\left(\frac{1}{x+1}-\frac{x}{x^3+1}\right)-\dfrac{x^3-x+1}{(x^2+x-2)^2}\right]\cdot\dfrac{x^3-3x+2}{x^2+x-1}$

$\left[\frac{1}{x+2} \quad - \quad C.E.: x\neq\pm 1, x\neq -2, x\neq\frac{-1\pm\sqrt{5}}{2}\right]$