

Oefeningen niveau 2

Oefening 1. Vereenvoudig indien mogelijk.

$$1. \frac{(b-a)^3}{a^2-b^2} = \frac{-(a-b)^2}{a+b}$$

$$2. \frac{x^2+1}{x^4+2x^2+1} = \frac{1}{x^2+1}$$

$$3. \frac{4x^2-12xy+9y^2}{4x^2-9y^2} = \frac{2x-3y}{2x+3y}$$

$$4. \frac{(2x-y)^2-(x+3y)^2}{(3x-y)^2-(2x+3y)^2} = \frac{3x+2y}{5x+2y}$$

$$5. \frac{a^2b+ac-ab^2c-bc^2}{a^2c-ab-abc^2+b^2c} = \frac{ab+c}{ac-b}$$

$$6. \frac{x^3-8}{2x^3+2x^2-8x-8} = \frac{x^2+2x+4}{2(x+2)(x+1)}$$

$$7. \frac{(x-3)(x-2)-2}{x-1} = x-4$$

$$8. \frac{(x-2)(x+5)+(x+1)}{x-2} = \frac{x^2+4x-9}{x-2}$$

$$9. \frac{2a(a+2)-(a^2-a-6)}{(a+2)^3} = \frac{a+3}{(a+2)^2}$$

$$10. \frac{x^3+3x^2+3x+1}{-2x^3-8x^2-10x-4} = \frac{-(x+1)}{2(x+2)}$$

Oefening 2. Vereenvoudig indien mogelijk. Zonder eerst in teller en noemer de gemeenschappelijke factoren af.

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

$$2. \frac{a^2-ab}{b^2-ab} = -\frac{a}{b}$$

$$3. \frac{a^2-a^6}{-a^7+a^5} = \frac{a^2+1}{a^3}$$

$$4. \frac{2(x-2)+(x-2)x^2}{x-2} = x^2+2$$

$$5. \frac{(4a-1)b+(1-4a)c}{b-c} = 4a-1$$

$$6. \frac{x^3+6x^2+9x}{x^3-9x} = \frac{x+3}{x-3}$$

$$7. \frac{2x-1+(2x-1)^2}{(2x-1)^3} = \frac{2x}{(2x-1)^2}$$

$$8. -\frac{(x-1)^3-3(x+1)(1-x)^2}{(x-1)^6} = \frac{2(x+2)}{(x-1)^4}$$

$$9. \frac{2a(a^2+3)-a^2 \cdot 2a}{a(a^2+3)^2} = \frac{6}{(a^2+3)^2}$$

$$10. \frac{ax+bx+ay+by+az+bz}{a+b} = x+y+z$$

Oefening 3. Bereken en vereenvoudig indien mogelijk.

$$1. \frac{3}{x+1} + \frac{2x+1}{x-2} = \frac{2x^2+6x-5}{(x-2)(x+1)}$$

$$2. \frac{2x+3}{2x-3} + \frac{7}{x} = \frac{17a+3}{3(a+2)}$$

$$3. \frac{4a+1}{a+2} + \frac{5a}{3(a+2)} = \frac{2x^2+17x-21}{x(2x-3)}$$

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

$$5. 1 - \frac{x-2}{3x+7} = \frac{2x+9}{3x+7}$$

$$6. \frac{a}{5} - \frac{a+2}{3a} = \frac{3a^2-5a-10}{15a}$$

$$7. \frac{2x-1}{x-5} + \frac{x+5}{2x+1} = \frac{5x^2-26}{(x-5)(2x+1)}$$

$$8. \frac{x-4}{x-1} - \frac{x-1}{x-4} = \frac{-3(2x-5)}{(x-4)(x-1)}$$

$$9. \frac{x}{x-4} + \frac{x-8}{x-4} = 2$$

$$10. \frac{a}{a-2} + \frac{2a-1}{2-a} = \frac{-(a-1)}{a-2}$$

Oefening 4. Bereken en vereenvoudig indien mogelijk.

$$1. \frac{2a^2}{(a-1)(a+1)} - \frac{a^2+1}{a^2-1} = 1$$

$$2. \frac{1}{(a-b)^2} + \frac{1}{(b-a)^2} = \frac{2}{(a-b)^2}$$

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

$$4. \frac{8}{(2+x)(x-2)} + \frac{2}{2-x} = \frac{-2}{x+2}$$

$$5. \frac{1}{x+1} + \frac{1}{x-1} + \frac{2}{(1-x)(1+x)} = \frac{2}{x+1}$$

$$6. \frac{4}{2+x} - \frac{8}{4-x^2} + \frac{2}{x-2} = \frac{2(3x+2)}{(x-2)(x+2)}$$

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

$$8. \frac{5x-9}{(x+2)(x-3)} + \frac{x-3}{(x+1)(x+2)} = \frac{2x(3x-5)}{(x+1)(x+2)(x-3)}$$

$$9. \frac{x-3}{(x-1)(x-2)} - \frac{x-1}{(x-2)(x-3)} = \frac{-4}{(x-3)(x-1)}$$

$$10. \frac{2x-3}{(2x-1)(x-1)} + \frac{x+3}{(2x-1)(2x+3)} = \frac{5x^2+2x-12}{(x-1)(2x-1)(2x+3)}$$

Oefening 5. Bereken en vereenvoudig indien mogelijk.

$$1. \frac{x+6}{x^2-16} - \frac{x+1}{x^2-4x} = \frac{1}{x(x+4)}$$

$$2. \frac{x+1}{x-1} + \frac{x-1}{x+1} - \frac{4}{x^2-1} = 2$$

$$3. \frac{4x}{x^2-4} + \frac{2}{x^2-5x+6} = \frac{2(2x-1)}{(x-3)(x+2)}$$

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

$$5. \frac{1}{x^2-x-2} - \frac{1}{x^3-4x^2+5x-2} = \frac{x(x-3)}{(x-2)(x+1)(x^2-2x+1)}$$

$$6. \frac{a^3-b^3}{a^2-b^2} - \frac{a^2b+ab^2}{a^2+ab} = \frac{a^2}{a+b}$$

$$7. \frac{a^4}{a^4-b^4} + \frac{1}{a^2-b^2-1} = \frac{a^2+b^2+b^4}{a^4-b^4}$$

$$8. \frac{1}{x-y} - \frac{3xy}{x^3-y^3} = \frac{x-y}{x^2+xy+y^2}$$

$$9. \frac{2a}{a^3+a^2b-ab^2-b^3} - \frac{1}{a^2-b^2} = \frac{1}{(a+b)^2}$$

$$10. \frac{1}{a^2-a} - \frac{1}{a^2+a} + \frac{2a^5}{a^2-a^4} = \frac{-2(a^2+1)}{a}$$

Oefening 6. Bereken en vereenvoudig indien mogelijk.

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1. $\frac{x^2 - x}{x - 1} \cdot \frac{5x - 5}{1 - x} = -5x$
2. $\frac{x^3 - 8}{x^3 + 8} \cdot \frac{x^2 + 4x + 4}{x^2 - 4} = \frac{x^2 + 2x + 4}{x^2 - 2x + 4}$
3. $\frac{xy + y^2}{(x - y)^2} \cdot \frac{x^2 - xy}{(x + y)^2} = \frac{xy}{x^2 - y^2}$
4. $\frac{2a^2 + 2ab}{ab - b^2} \cdot \frac{a^2 - b^2}{a^2 + 2ab + b^2} = \frac{2a}{b}$
5. $\frac{x^2 + 3x - 10}{2x} \cdot \frac{x^2 - 3x}{x^2 - 5x + 6} = \frac{1}{2}(x + 5)$

Oefening 7. Bereken en vereenvoudig indien mogelijk.

1. $\left(1 - \frac{1}{x-2}\right) \left(x - 3 + \frac{1}{x-3}\right) = \frac{x^2 - 6x + 10}{x - 2}$
2. $\left(x - \frac{x+2}{x}\right) \left(5 - \frac{1}{x+1}\right) = \frac{(x-2)(5x+4)}{x}$
3. $\left(x - \frac{x-y}{1+xy}\right) \left(x - \frac{2}{x+1}\right) = \frac{(x^2+1)(x^2+x-2)y}{(x+1)(xy+1)}$
4. $\left(3 - \frac{1}{a+2}\right) \left(a + 1 + \frac{2a+1}{a-1}\right) = \frac{a(3a+5)}{a-1}$
5. $\left(\frac{b+a}{b+2a} - \frac{b-a}{b-2a}\right) \left(\frac{b^2}{a^2} - 4\right) = \frac{-2b}{a}$

Oefening 8. Bereken en vereenvoudig indien mogelijk.

1. $\frac{\frac{5x^2-5}{x^2}}{\frac{6x+6}{x^3}} = \frac{5x(x-1)}{6}$
2. $\frac{\frac{x^2+5x+6}{x^2+6x+5}}{\frac{x^2+4x+4}{x^2+7x+10}} = \frac{x+3}{x+1}$
3. $\frac{3 + \frac{1}{x-2}}{3 - \frac{1}{x-5}} = \frac{(x-5)(3x-5)}{(x-2)(3x-16)}$
4. $\frac{x - \frac{1}{x}}{x + \frac{1}{x}} = \frac{x^2 - 1}{x^2 + 1}$
5. $\frac{\frac{1}{a-b} + 1}{\frac{1}{a-b} - 1} = \frac{-(a-b+1)}{a-b-1}$
6. $\frac{(x-3)^2}{x} \div (x^2 - 9) = \frac{x-3}{x(x+3)}$
7. $\frac{5 + \frac{3}{x+1}}{5} = \frac{5x+8}{5(x+1)}$
8. $\frac{x+2}{\frac{3}{x+4} - 2} = \frac{-(x+2)(x+4)}{2x+5}$
9. $\frac{1}{\frac{1}{a} - \frac{1}{b}} \cdot \left(\frac{b}{a} - \frac{a}{b}\right) = a + b$
10. $\frac{1}{1 + \frac{4x^2}{(x^2-1)^2}} \cdot \frac{(x^2+1)^2}{(x-1)^2} = (x+1)^2$

Oefening 9. Bereken en vereenvoudig indien mogelijk.

1. $\left(\frac{1}{a} + \frac{1}{b}\right)^{-1} = \frac{ab}{a+b}$
2. $\left(\frac{a}{a-b} - \frac{b}{b-a}\right)^{-1} = \frac{a-b}{a+b}$
3. $(y^{-2} - x^{-2}) \left(\frac{1}{y} - \frac{1}{x}\right)^{-1} = \frac{x+y}{xy}$

Oefening 10. Bereken en vereenvoudig indien mogelijk.

1. $\frac{(a-1)^3 - (a+1)(a-1)^2}{(a-1)^6} = \frac{-2}{(a-1)^4}$
2. $\frac{3x+3}{x^2-2x} - \frac{2x+2}{x^2-4} = \frac{(x+1)(x+6)}{x(x^2-4)}$
3. $\left(\frac{1}{y^2} - \frac{1}{x^2}\right) \cdot \frac{y}{1 - \frac{y}{x}} = \frac{x+y}{xy}$

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$$4. \frac{1+t}{1-t^2} + \frac{1+t}{(1-t)^2} = \frac{2}{(1-t)^2}$$

$$5. \frac{x^2 - y^2 + x + y}{x + y} = x - y + 1$$

$$6. \frac{1}{y} - y / 1 - \frac{1}{y} = -(y + 1)$$

$$7. \frac{1+x}{1+2x+x^2} - \frac{1+x}{1+x^3} = \frac{x(x-2)}{x^3+1}$$

$$8. \frac{\frac{x^2-4}{(x-2)^2}}{x+2} = \frac{1}{x-2}$$

$$9. \frac{x^2-4}{\frac{(x-2)^2}{x+2}} = \frac{(x+2)^2}{x-2}$$

$$10. \frac{1}{\frac{a-b}{ab}} \cdot \left(\frac{b}{a} - \frac{a}{b}\right) = -(a+b)$$

$$11. \frac{1}{a^2-2a} + 5 + \frac{6}{2-a} = \frac{5a^2-16a+1}{a^2-2a}$$

$$12. \frac{1}{\frac{1}{x} + \frac{1}{y}} = \frac{xy}{x+y}$$

$$13. \frac{x+2y}{\frac{1}{x} - \frac{2}{y}} = \frac{xy(x+2y)}{y-2x}$$

$$14. \frac{(x-a)(x^2+2ax+a^2)}{x^3+a^3} \cdot \frac{x^2-ax+a^2}{x^3-a^3} = \frac{x+a}{x^2+ax+a^2}$$

$$15. \frac{x^3-y^3}{x^4-y^4} \cdot \frac{x^2+y^2}{x^2+xy+y^2} \cdot \frac{x-y}{(x+y)^2} = \frac{x-y}{(x+y)^3}$$

$$16. (y^{-2} - x^{-2}) \cdot \frac{y}{1-yx^{-1}} = \frac{x+y}{xy}$$

$$17. \left(1 - \frac{1}{x}\right) \left(2 - \frac{1}{x}\right) \cdot \frac{1}{x^2 - 3x + 2} = \frac{2x-1}{x^2(x-2)}$$

$$18. \frac{2x+3}{x^2-7x+12} - \frac{2}{x-3} = \frac{11}{(x-4)(x-3)}$$

$$19. \frac{2x^2-x-6}{\frac{4}{x^2}-1} = \frac{-x^2(2x+3)}{x+2}$$

$$20. \frac{\frac{1}{x^2}-1}{\frac{1}{x}-\frac{2}{x^2}-\frac{3}{x^3}} = \frac{-x(x-1)}{x-3}$$