

Repetitorium matematiky

$$(a+b)^2 = a^2 + 2ab + b^2$$

$$(a-b)^2 = a^2 - 2ab + b^2$$

$$(a+b)(a-b) = a^2 - b^2$$

Test repetitorium

Cv. Upravte do základního tvaru: $\left(\frac{-16}{3}\right) \cdot \sqrt{\frac{2}{3}} + \frac{\frac{64}{9}}{2 \cdot \sqrt{\frac{2}{3}}}$

$$\left(\frac{-16}{3}\right) \cdot \sqrt{\frac{2}{3}} + \frac{\frac{64}{9}}{2 \cdot \sqrt{\frac{2}{3}}} = -\frac{2^4}{3} \cdot \frac{2^{\frac{1}{2}}}{3^{\frac{1}{2}}} + \frac{\frac{2^6}{3^2}}{2 \cdot \frac{2^{\frac{1}{2}}}{3^{\frac{1}{2}}}} = -\frac{2^{\frac{9}{2}}}{3^{\frac{3}{2}}} + \left(\frac{2^6}{3^2} \cdot \frac{3^{\frac{1}{2}}}{2^{\frac{3}{2}}}\right) = -\frac{2^{\frac{9}{2}}}{3^{\frac{3}{2}}} + \frac{2^{\frac{9}{2}}}{3^{\frac{3}{2}}} = \underline{\underline{0}}$$

Cv. Zjednodušte $\left(x - \frac{3x}{x+1}\right) \cdot \left(\frac{x-1}{x-2} - \frac{x}{x-1}\right)$

$$\begin{aligned} & \left(x - \frac{3x}{x+1}\right) \cdot \left(\frac{x-1}{x-2} - \frac{x}{x-1}\right) = \left(x - \frac{3x}{x+1}\right) \cdot \left(\frac{x-1}{x-1} \cdot \frac{x-1}{x-2} - \frac{x}{x-1}\right) = \\ & = \left(x - \frac{3x}{x+1}\right) \cdot \left(\frac{(x-1)^2}{(x-2)(x-1)} - \frac{x}{x-1}\right) = \left(x - \frac{3x}{x+1}\right) \cdot \left(\frac{(x-1)^2 - (x \cdot (x-2))}{(x-2)(x-1)}\right) = \\ & = \left(\frac{(x+1)x}{x+1} - \frac{3x}{x+1}\right) \cdot \left(\frac{(x-1)^2 - (x^2 - 2x)}{(x-2)(x-1)}\right) = \\ & = \left(\frac{x^2 - 2x}{x+1}\right) \cdot \left(\frac{x^2 - 2x + 1 - x^2 + 2x}{(x-2)(x-1)}\right) = \left(\frac{x^2 - 2x}{x+1}\right) \cdot \left(\frac{1}{(x-2)(x-1)}\right) = \\ & = \frac{x(x-2)}{x+1} \cdot \frac{1}{(x-2)(x-1)} = \frac{x}{x+1} \cdot \frac{1}{x-1} = \underline{\underline{\frac{x}{x^2-1}}} \end{aligned}$$

Cv. Zjednodušte $\frac{3y+2}{y^2-2y+1} - \frac{6}{y^2-1} - \frac{3y-2}{y^2+2y+1}$

$$\begin{aligned} & \frac{3y+2}{y^2-2y+1} - \frac{6}{y^2-1} - \frac{3y-2}{y^2+2y+1} \\ & = \frac{3y+2}{(y-1)(y-1)} - \frac{6}{(y+1)(y-1)} - \frac{3y+2}{(y+1)(y+1)} \\ & = \frac{((3y+2) \cdot (y+1)) - ((6) \cdot (y-1))}{(y-1)^2(y+1)} - \frac{3y+2}{(y+1)^2} \\ & = \frac{3y^2 + 3y + 2y + 2 - 6y + 6}{(y-1)^2(y+1)} - \frac{3y+2}{(y+1)^2} \\ & = \frac{3y^2 - y + 8}{(y-1)^2(y+1)} - \frac{3y+2}{(y+1)^2} \\ & = \frac{((3y^2 - y + 8) \cdot (y+1)) - ((3y+2)(y^2 - 2y + 1))}{(y^2-1)^2} \\ & = \frac{(3y^3 + 3y^2 - y^2 - y + 8y + 8) - (3y^3 - 6y^2 + 3y + 2y^2 - 4y + 2)}{(y^2-1)^2} \\ & = \frac{3y^3 + 3y^2 - y^2 - y + 8y + 8 - 3y^3 + 6y^2 - 3y - 2y^2 + 4y - 2}{(y^2-1)^2} \\ & = \frac{6y^2 + 8y + 6}{(y^2-1)^2} = \underline{\underline{\frac{2(3y^2 + 4y + 3)}{(y^2-1)^2}}} \end{aligned}$$

Cv. Řešte rovnici s neznámou $x \in \mathbb{R}$

$$\begin{aligned}\frac{x+5}{10} - \frac{x-4}{8} &= 1 \\ \frac{((x+5) \cdot (8)) - ((x-8) \cdot (10))}{80} &= 1 \\ \frac{8x+40-10x+80}{80} &= 1 \\ 8x+40-10x+80 &= 80 \\ -2x &= -40 \\ x &= 20\end{aligned}$$

$$\begin{aligned}
 & \left(\frac{1}{x+1} - \frac{2x}{x^2-1} \right) \left(\frac{1}{x} - 1 \right) = \left(\frac{1}{x+1} - \frac{2x}{(x+1)(x-1)} \right) \left(\frac{1}{x} - 1 \right) = \\
 & = \left(\frac{1}{x+1} \cdot \frac{x-1}{x-1} - \frac{2x}{(x+1)(x-1)} \right) \left(\frac{1}{x} - 1 \right) = \left(\frac{x-1}{(x+1)(x-1)} - \frac{2x}{(x+1)(x-1)} \right) \left(\frac{1}{x} - 1 \right) = \\
 & = \left(\frac{-x-1}{(x+1)(x-1)} \right) \left(\frac{1}{x} - \frac{x}{x} \right) = \frac{-x-1}{(x+1)(x-1)} \cdot \frac{1-x}{x} = \frac{-(x+1)}{(x+1)(x-1)} \cdot \frac{1-x}{x} = \\
 & = \frac{-1}{x-1} \cdot \frac{1-x}{x} = \frac{-(1-x)}{(x-1)(x)} = \frac{-(-1)(x-1)}{(x-1)x} = \frac{1}{\underline{\underline{x}}}
 \end{aligned}$$

$$\begin{aligned}
 & \left(\frac{3}{(x-3)^2} + \frac{1}{x+3} - \frac{6}{x^2-9} \right) \cdot \frac{x^2-6x+9}{2} = \left(\frac{3}{(x-3)(x-3)} + \frac{1}{x+3} - \frac{6}{(x+3)(x-3)} \right) \cdot \frac{(x-3)(x-3)}{2} = \\
 & = \left(\frac{3}{(x-3)(x-3)} + \frac{x-3}{(x+3)(x-3)} - \frac{6}{(x+3)(x-3)} \right) \cdot \frac{(x-3)(x-3)}{2} = \\
 & = \left(\frac{3}{(x-3)(x-3)} + \frac{x-9}{(x+3)(x-3)} \right) \cdot \frac{(x-3)(x-3)}{2} = \\
 & = \left(\frac{3}{(x-3)(x-3)} + \frac{x-9}{(x+3)(x-3)} \cdot \frac{(x-3)}{(x-3)} \right) \cdot \frac{(x-3)(x-3)}{2} = \\
 & = \left(\frac{3}{(x-3)^2} + \frac{(x-9)(x-3)}{(x+3)(x-3)^2} \right) \cdot \frac{(x-3)^2}{2} = \frac{3x+9+((x-9)(x-3))}{(x+3)(x-3)^2} \cdot \frac{(x-3)^2}{2} = \\
 & = \frac{3x+9+((x-9)(x-3))}{2(x+3)} = \frac{3x+9+(x^2-3x-9x+27)}{2(x+3)} = \\
 & = \frac{x^2-9x+36}{\underline{\underline{2(x+3)}}}
 \end{aligned}$$

$$\frac{x^2+7x}{9-x^2} : \frac{x^2-49}{x+3} = \frac{x(x+7)}{(x+3)(-x+3)} \cdot \frac{x+3}{(x+7)(x-7)} = \frac{x}{\underline{\underline{(x-7)(3-x)}}}$$