OPAKOVÁNÍ

A) ROVNICE A NEROVNICE

Příklad 1. Řešte v $\mathbb{R}$:

1) $2x^2 - 3x - 5 = 0$ $\qquad [x \in \{-1, \frac{5}{2}\}]$

2) $x^2 + 2x - 15 = 0$ ... řešte pomocí Vièteových vzorců $\qquad [x \in \{3, -5\}]$

3) $x^2 - |x - 1| = 1$ $\qquad [x \in \{-2, 1\}]$

4) $|x + 2| \geq 3$ $\qquad [x \in (-\infty, -5\rangle \cup \langle 1, \infty)]$

5) $x^2 < 4$ $\qquad [x \in (-2, 2)]$

6) $x^2 - 5x - 6 > 0$ $\qquad [x \in (-\infty, -1) \cup (6, \infty)]$

7) $4^{x+1} + 8 \cdot 4^x = 12$ $\qquad [x = 0]$

8) $25^{-x} + 5^{1-x} = 50$ $\qquad [x = -1]$

9) $\log_3(x + 1) + \log_3(x + 3) = 1$ $\qquad [x = 0]$

10) $2^{\ln x} - 4^{\ln x} = 0$ $\qquad [x = 1]$

11) $3 \operatorname{cotg} \dfrac{x}{2} = -\sqrt{3}$ $\qquad [x = \frac{4}{3}\pi + 2k\pi]$

12) $\sin\left(x + \dfrac{\pi}{6}\right) = \dfrac{1}{2}$ $\qquad [x_1 = 2k\pi,\ x_2 = \frac{2}{3} + 2k\pi]$

B) ÚPRAVY VÝRAZŮ

Příklad 2. Upravte výrazy na co nejjednodušší tvar:

1) $\dfrac{2x}{x+2} - \dfrac{6x}{6-3x} + \dfrac{8x}{x^2-4}$ $\qquad \left[\dfrac{4x}{x-2}\right]$

2) $\dfrac{\dfrac{x}{x-1} - \dfrac{x+1}{x}}{\dfrac{x}{x-1} - 1}$ $\qquad \left[\dfrac{1}{x}\right]$

3) $\dfrac{a^3 - b^3}{a + \dfrac{b^2}{a+b}}$ $\qquad [a^2 - b^2]$

4) $\left(\dfrac{x-1}{x-2} - \dfrac{x}{x-1}\right) \cdot \left(x - \dfrac{x}{x+1}\right) \cdot (x^2 - 1)$ $\qquad \left[\dfrac{x^2}{x-2}\right]$

5) $\dfrac{\dfrac{b}{a^2+ab} + \dfrac{2}{a+b} + \dfrac{a}{b^2+ab}}{\dfrac{a}{b} - \dfrac{b}{a}}$ $\qquad \left[\dfrac{1}{a-b}\right]$

6) $\dfrac{\dfrac{1}{x+y}+\dfrac{x-y}{(x+y)^2}}{1+\left(\dfrac{x-y}{x+y}\right)^2}$ $\left[\dfrac{x}{x^2+y^2}\right]$

7) $\dfrac{\dfrac{a^2+4}{a}-2}{\left(\dfrac{1}{a^2}+\dfrac{1}{4}\right)\cdot\dfrac{a^3+8}{a^2+4}}$ $\left[\dfrac{4a}{a+2}\right]$

8) $\dfrac{\left(ab-\dfrac{1}{ab}\right)^2}{\left(a+\dfrac{1}{b}\right)^2\cdot\left(b-\dfrac{1}{a}\right)^3}$ $\left[\dfrac{a}{ab-1}\right]$

9) $\dfrac{\left(x^2-y^2\right)^2}{x^3-y^3}\cdot\dfrac{x^2+xy+y^2}{x^3+y^3}\cdot\dfrac{1}{x^2+2xy+y^2}+\dfrac{\dfrac{1-x}{x-x^2}}{x-y+\dfrac{y^2}{x}}$ $\left[\dfrac{2x}{x^3+y^3}\right]$

10) $\dfrac{\dfrac{a^2+b^2}{b}+2a}{\dfrac{1}{b}+\dfrac{1}{a}}+\dfrac{2b-\dfrac{a^2+b^2}{a}}{\dfrac{1}{b}-\dfrac{1}{a}}$ $[a^2+b^2]$

Příklad 3. Upravte výrazy na co nejjednodušší tvar:

1) $\dfrac{\cos^2 x}{1+\sin x}$ $[1-\sin x]$

2) $\dfrac{\sin 2x}{1-\cos 2x}$ $[\operatorname{cotg} x]$

3) $\dfrac{1}{1+\operatorname{tg}^2 x}+\dfrac{1}{1+\operatorname{cotg}^2 x}$ $[1]$

4) $\dfrac{\sin x}{1+\cos x}+\dfrac{\sin x}{1-\cos x}$ $\left[\dfrac{2}{\sin x}\right]$

5) $\dfrac{1+\cos 2x}{1-\cos 2x}$ $[\operatorname{cotg}^2 x]$

6) $\dfrac{\operatorname{tg} x}{1+\operatorname{tg}^2 x}$ $\left[\dfrac{1}{2}\sin 2x\right]$

7) $\dfrac{1-\cos 2x+\sin 2x}{1+\cos 2x+\sin 2x}$ $[\operatorname{tg} x]$

8) $\dfrac{\sin x-\sin^3 x}{\cos x-\cos^3 x}$ $[\operatorname{cotg} x]$

9) $\dfrac{2\sin x-\sin 2x}{2\sin x+\sin 2x}$ $\left[\operatorname{tg}^2\dfrac{x}{2}\right]$

10) $\dfrac{\operatorname{tg} x\cdot\operatorname{tg} 2x}{\operatorname{tg} x-\operatorname{tg} 2x}$ $[-\sin 2x]$