IRACIONALNE ENAČBE

1. $\sqrt{x} = 7 \quad /^2$

$x = 49$

PREIZKUS: $\sqrt{49} = 7$

$7 = 7$ ✓

2. $\sqrt{x} - 4 = 0$

$\sqrt{x} = 4 \quad /^2$

$x = 16$

PREIZKUS: $\sqrt{16} - 4 = 0$

$4 - 4 = 0$

$0 = 0$ ✓

3. $2\sqrt{2x+3} = 3\sqrt{3x-5} \quad /^2$

$4(2x+3) = 9(3x-5)$

$8x + 12 = 27x - 45$

$-19x = -57 \quad /:(-19)$

$x = 3$

PREIZKUS: $2\sqrt{2\cdot 3+3} = 3\sqrt{3\cdot 3-5}$

$2\sqrt{6+3} = 3\sqrt{9-5}$

$2\cdot\sqrt{9} = 3\sqrt{4}$

$2\cdot 3 = 3\cdot 2$

$6 = 6$ ✓

4. $2\sqrt{8-2x} = x-4 \quad /^2$

$4(8-2x) = (x-4)^2$ ← obvezno v oklepaj

$32 - 8x = x^2 - 8x + 16$

$0 = x^2 - 16$

$0 = (x+4)(x-4)$

$x_1 = -4$, $x_2 = 4$

$x_1 = -4$ ne ustreza

PREIZKUS:

$x_1 = -4$: $2\sqrt{8-2\cdot(-4)} = -4-4$

$2\sqrt{8+8} = -8$

$2\cdot 4 = -8$

$8 = -8$ //

$x_2 = 4$: $2\sqrt{8-2\cdot 4} = 4-4$

$2\cdot 0 = 0$

$0 = 0$ ✓

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

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

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5. $2x+3=\sqrt{3x^2+5x-1}\ /^2$

$(2x+3)^2 = 3x^2+5x-1$
$4x^2+12x+9 = 3x^2+5x-1$
$x^2+7x+10=0$
$(x+2)(x+5)=0$
~~$x_1=-2$~~ , ~~$x_2=-5$~~
ni rešitve

PREIZKUS:
$x_1=-2$: $2\cdot(-2)+3=\sqrt{3\cdot(-2)^2+5\cdot(-2)-1}$
$-4+3=\sqrt{3\cdot4-10-1}$
$-1=\sqrt{12-11}$
$-1=1$ //

$x_2=-5$: $2\cdot(-5)+3=\sqrt{3\cdot(-5)^2+5\cdot(-5)-1}$
$-10+3=\sqrt{3\cdot25-25-1}$
$-7=\sqrt{75-26}$
$-7=\sqrt{49}$
$-7=7$ //

6. $\sqrt{x^2+4}=x-1\ /^2$

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

PREIZKUS: $\sqrt{(-\frac{3}{2})^2+4}=-\frac{3}{2}-1$
$\sqrt{\frac{9}{4}+4}=-\frac{5}{2}$
$\sqrt{\frac{25}{4}}=-\frac{5}{2}$
$\frac{5}{2}=-\frac{5}{2}$ //

7. $\sqrt{3+\sqrt{3x+4}}=2\ /^2$

$3+\sqrt{3x+4}=4$
$\sqrt{3x+4}=1\ /^2$
$3x+4=1$
$3x=-3$
$x=-1$

PREIZKUS: $\sqrt{3+\sqrt{3\cdot(-1)+4}}=2$
$\sqrt{3+\sqrt{1}}=2$
$\sqrt{4}=2$
$2=2$ ✓

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8. $x+\sqrt{16-3x}=2$

$\sqrt{16-3x}=2-x\ /^2$
$16-3x=(2-x)^2$
$16-3x=4-4x+x^2$
$0=x^2-x-12$
$0=(x-4)(x+3)$
~~$x_1=4$~~ , ~~$x_2=-3$~~
ni rešitve

PREIZKUS:
$x_1=4$: $4+\sqrt{16-3\cdot4}=2$
$4+\sqrt{16-12}=2$
$4+\sqrt{4}=2$
$4+2=2$
$6=2$ //

$x_2=-3$: $4+\sqrt{16-3\cdot(-3)}=2$
$4+\sqrt{16+9}=2$
$4+\sqrt{25}=2$
$4+5=2$
$9=2$ //

9. $\sqrt{x} - \sqrt{x-5} = \sqrt{2x-17} \quad /^2$

$(\sqrt{x} - \sqrt{x-5})^2 = 2x - 17$

obvezno v oklepaj

$\sqrt{x^2} - 2\sqrt{x}\sqrt{x-5} + \sqrt{x-5}^2 = 2x - 17$

$x - 2\sqrt{x(x-5)} + x - 5 = 2x - 17$

$2x - 5 - 2\sqrt{x(x-5)} = 2x - 17$

$-2\sqrt{x(x-5)} = -12 \quad /:(-2)$

$\sqrt{x(x-5)} = 6 \quad /^2$

$x(x-5) = 36$

$x^2 - 5x - 36 = 0$

$(x-9)(x+4) = 0$

$x_1 = 9$, ~~$x_2 = -4$~~

PREIZKUS:

$x_1 = 9$: $\sqrt{9} - \sqrt{9-5} = \sqrt{2 \cdot 9 - 17}$

$3 - 2 = \sqrt{18-17}$

$1 = 1$ ✓

$x_2 = -4$: $\sqrt{-1} + \ldots$ ne more biti negativno pod korenom

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10. $\sqrt{x+11} + \sqrt{x+4} = 7 \quad /^2$

$(\sqrt{x+11} + \sqrt{x+4})^2 = 49$

$x + 11 + 2\sqrt{(x+11)(x+4)} + x + 4 = 49$

$2\sqrt{(x+11)(x+4)} = 34 - 2x \quad /:2$

$\sqrt{(x+11)(x+4)} = 17 - x \quad /^2$

$(x+11)(x+4) = (17-x)^2$

~~x^2~~ $+ 4x + 11x + 44 = 289 - 34x +$ ~~x^2~~

$49x = 245$

$x = 5$

PREIZKUS:

$\sqrt{5+11} + \sqrt{5+4} = 7$

$\sqrt{16} + \sqrt{9} = 7$

$4 + 3 = 7$

$7 = 7$ ✓

11. $\sqrt{x+1} + \sqrt{x-1} = \sqrt{2} \quad /^2$

$(\sqrt{x+1} + \sqrt{x-1})^2 = 2$

$x + 1 + 2\sqrt{(x+1)(x-1)} + x - 1 = 2$

$2x + 2\sqrt{x^2-1} = 2$

$2\sqrt{x^2-1} = 2 - 2x \quad /:2$

$x^2 - 1 = 1 - x$

$x^2 + x - 2 = 0$

$(x+2)(x-1) = 0$

~~$x_1 = -2$~~, $x_2 = 1$

PREIZKUS:

$x_1 = -2$: $\sqrt{-2+1} + \sqrt{-2-1} = \sqrt{2}$

$\sqrt{\ominus 1} + \sqrt{\ominus 3} = \sqrt{2}$ //

$x_2 = 1$: $\sqrt{1+1} + \sqrt{1-1} = \sqrt{2}$

$\sqrt{2} + 0 = \sqrt{2}$ ✓

12. $\sqrt{15+x} = 3\sqrt{3} - \sqrt{x} \quad /^2$

$15 + x = (3\sqrt{3} - \sqrt{x})^2$
$15 + x = 27 - 6\sqrt{3}\sqrt{x} + x$
$15 + x - 27 - x = -6\sqrt{3x}$
$-12 = -6\sqrt{3x} \quad /:(-6)$
$2 = \sqrt{3x} \quad /^2$
$4 = 3x$
$x = \frac{4}{3}$

PREIZKUS:

$\sqrt{15+\frac{4}{3}} = 3\sqrt{3} - \sqrt{\frac{4}{3}}$

$\sqrt{\frac{49}{3}} = 3\sqrt{3} - \frac{2}{\sqrt{3}}$

$\frac{7}{\sqrt{3}} = \frac{9}{\sqrt{3}} - \frac{2}{\sqrt{3}}$

$\frac{7}{\sqrt{3}} = \frac{7}{\sqrt{3}}$ ✓

13. $\sqrt[3]{x\sqrt{x}} = 4 \quad /^3$

$x\sqrt{x} = 64 \quad /^2$
$x^2 \cdot x = 4096$
$x^3 = 4096$
$x = \sqrt[3]{4096}$
$x = 16$

PREIZKUS:

$\sqrt[3]{16\sqrt{16}} = 4$

$\sqrt[3]{16 \cdot 4} = 4$

$\sqrt[3]{64} = 4$

$4 = 4$ ✓

14. $\sqrt[3]{x+3+\sqrt{x+1}} = 2 \quad /^3$

$x + 3 + \sqrt{x+1} = 8$
$\sqrt{x+1} = 5 - x \quad /^2$
$x + 1 = (5-x)^2$
$x + 1 = 25 - 10x + x^2$
$0 = x^2 - 11x + 24$
$0 = (x-8)(x-3)$
~~$x_1 = 8$~~ , ~~$x_2 = 3$~~
ni rešitve

PREIZKUS:

$x_1 = 8$: $\sqrt[3]{8+11+\sqrt{8+1}} = 2$
$\sqrt[3]{19+3} = 2$
$\sqrt[3]{22} = 2$ //

$x_2 = 3$: $\sqrt[3]{3+11+\sqrt{3+1}} = 2$
$\sqrt[3]{14+2}$
$\sqrt[3]{16} = 2$ //

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15. $\sqrt[5]{x-1-\sqrt{2x}} = -1 \quad /^5$

$x - 1 - \sqrt{2x} = -1$
$x - \sqrt{2x} = 0$
$x = \sqrt{2x} \quad /^2$
$x^2 = 2x$
$x^2 - 2x = 0$
$x(x-2) = 0$
$x_1 = 0 \;,\; x_2 = 2$

PREIZKUS:

$x_1 = 0: \sqrt[5]{0-1-\sqrt{2\cdot 0}} = -1$
$\sqrt[5]{-1} = -1$
$-1 = -1$ ✓

$x_2 = 2: \sqrt[5]{2-1-\sqrt{2\cdot 2}} = -1$
$\sqrt[5]{1-2} = -1$
$\sqrt[5]{-1} = -1$
$-1 = -1$ ✓

Še več rešenih primerov najdeš v knjigi

Rešene matematične naloge za 2. letnik

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