

Másodfokú, gyökös egyenletek, egyenlőtlenségek

1. Oldjuk meg a következő egyenleteket a valós számok halmazán!

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|----------------------------|--|-----------------------------|--------------------------------------|------------------------------|--|
| a) $3x^2 + 9x + 6,75 = 0$ | <input type="text" value="-1;5;-1;5"/> | b) $-x^2 + 6,5x - 7,5 = 0$ | <input type="text" value="5;1;5"/> | c) $3x^2 + 4,5x + 1,5 = 0$ | <input type="text" value="-0;5;-1"/> |
| d) $3x^2 + 19,5x + 27 = 0$ | <input type="text" value="-4;5;-2"/> | e) $x^2 - 25 = 0$ | <input type="text" value="5;-5;5"/> | f) $-2x^2 + x + 15 = 0$ | <input type="text" value="-2;5;3"/> |
| g) $x^2 + 3x + 0 = 0$ | <input type="text" value="0;-3;0"/> | h) $3x^2 - 21x + 33,75 = 0$ | <input type="text" value="4;5;2;5"/> | i) $x^2 + 8x + 15,75 = 0$ | <input type="text" value="-4;5;-3;5"/> |
| j) $-2x^2 + 3x + 2 = 0$ | <input type="text" value="-0;5;2"/> | k) $-x^2 + 0,5x + 10,5 = 0$ | <input type="text" value="3;5;3;5"/> | l) $x^2 - 0,5x - 1,5 = 0$ | <input type="text" value="1;5;-1"/> |
| m) $x^2 + 6x + 6,75 = 0$ | <input type="text" value="1;5;-4;5"/> | n) $-x^2 + 5,5x - 6 = 0$ | <input type="text" value="4;1;5"/> | o) $3x^2 + 19,5x + 22,5 = 0$ | <input type="text" value="-1;5;-5"/> |
| p) $-2x^2 - 4x + 2,5 = 0$ | <input type="text" value="2;5;0;5"/> | q) $x^2 - 6x + 8 = 0$ | <input type="text" value="2;4"/> | r) $x^2 + 9x + 20 = 0$ | <input type="text" value="5;-4"/> |
| s) $x^2 + x - 12 = 0$ | <input type="text" value="4;3"/> | t) $x^2 - 5x + 6 = 0$ | <input type="text" value="2;3"/> | u) $5x^2 + 7x + 2 = 0$ | <input type="text" value="1;-0;4"/> |
| v) $5x^2 - 26x - 24 = 0$ | <input type="text" value="9;8;0;-"/> | w) $2x^2 - 3x + 8 = 0$ | <input type="text" value="nincs"/> | x) $3x^2 - 8x + 4 = 0$ | <input type="text" value="3;2"/> |

2. Oldd meg az alábbi egyenleteket!

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|--------------------------------------|--|--------------------------------|--|
| a) $8x^2 - 16x + 9 = 0$ | <input type="text" value="nincs"/> | b) $16x^2 + 16x + 3 = 0$ | <input type="text" value="-0;75;-0;25"/> |
| c) $(2x + 2) \cdot (x - 1) = 5x + 6$ | <input type="text" value="-1;108;3;6098"/> | d) $x(2x + 3) = -12x - 6$ | <input type="text" value="-7;076;-0;424"/> |
| e) $8x(x + 2) + 3(x + 1) + 1 = 0$ | <input type="text" value="-2;1415;-0;2335"/> | f) $(1 + 2x)(3 - x) + x^2 = 9$ | <input type="text" value="2;3"/> |

3. Oldd meg az alábbi, másodfokúra visszavezethető, magasabb fokú egyenleteket!

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|------------------------------------|---|--|--|
| a) $125x^6 + 7x^3 - 0,064 = 0$ | <input type="text" value="-0;4;0;2"/> | b) $625x^8 - 1312x^4 + 33,1776 = 0$ | <input type="text" value="-1;2;-0;4;0;4;1;2"/> |
| c) $125x^6 - 1125x^3 + 1000 = 0$ | <input type="text" value="1;2"/> | d) $125x^6 + 65x^3 + 0,512 = 0$ | <input type="text" value="-0;8;-0;2"/> |
| e) $625x^8 - 162x^4 + 10,4976 = 0$ | <input type="text" value="9;-0;9;0;-"/> | f) $15625x^{12} - 1262144x^6 + 16777216 = 0$ | <input type="text" value="-2;-1;6;1;6;2"/> |
| g) $125x^6 + 1216x^3 + 1728 = 0$ | <input type="text" value="-2;-1;2"/> | h) $15625x^{12} - 379793x^6 + 1973823 = 0$ | <input type="text" value="-1;6;-1;4;1;4;1;6"/> |

i) $625x^8 - 10657x^4 + 42998,17 = 0$

$$\boxed{-1,8; -1,6; 1,6; 1,8}$$

j) $25x^4 - 65x^2 + 2,56 = 0$

$$\boxed{-1,6; -0,2; 0,2; 1,6}$$

k) $15625x^{12} - 1000001x^6 + 64 = 0$

$$\boxed{-2; -0,2; 0,2; 2}$$

l) $25x^4 - 104x^2 + 16 = 0$

$$\boxed{-2; -0,4; 0,4; 2}$$

m) $15625x^{12} - 47385x^6 + 2176,782 = 0$

$$\boxed{-1,2; -0,6; 0,6; 1,2}$$

n) $125x^6 - 559x^3 + 592,704 = 0$

$$\boxed{1,2; 1,4}$$

o) $25x^4 - 113x^2 + 125,44 = 0$

$$\boxed{-1,6; -1,4; 1,4; 1,6}$$

p) $125x^6 + 513x^3 + 4,096 = 0$

$$\boxed{-1,6; -0,2}$$

q) $125x^6 - 152x^3 - 110,592 = 0$

$$\boxed{-0,8; 1,2}$$

r) $15625x^{12} - 578097x^6 + 1586874 = 0$

$$\boxed{-1,8; -1,2; 1,2; 1,8}$$

s) $625x^8 - 1377x^4 + 167,9616 = 0$

$$\boxed{-1,2; -0,6; 0,6; 1,2}$$

t) $125x^6 - 2097,152 = 0$

$$\boxed{-1,6; 1,6}$$

u) $15625x^{12} - 15626x^6 + 1 = 0$

$$\boxed{-1; -0,2; 0,2; 1}$$

v) $3125x^{10} - 242x^5 - 0,07776 = 0$

$$\boxed{-0,2; 0,6}$$

w) $3125x^{10} + 75856x^5 + 317579,7 = 0$

$$\boxed{-1,8; -1,4}$$

x) $3125x^{10} + 15961x^5 - 176234,2 = 0$

$$\boxed{-1,6; 1,4}$$

4. Oldd meg az alábbi egyenleteket!

a) $x^4 - 5x^2 + 4 = 0$

$$\boxed{\pm 1, \pm 2}$$

b) $x^4 - 125x^2 + 484 = 0$

$$\boxed{\pm 11, \pm 2}$$

c) $x^8 - 13x^4 + 36 = 0$

$$\boxed{\pm \sqrt{3}, \pm \sqrt{2}}$$

d) $x^6 - 2x^3 - 8 = 0$

$$\boxed{\pm \sqrt[3]{2}, -\sqrt[3]{2}}$$

e) $(x-1)^2 - 5(x-1) + 6 = 0$

$$\boxed{3, 4}$$

f) $(x^2+5x)^2 - 2(x^2+5x) = 24$

$$\boxed{-6, -4, \pm 1}$$

5. Oldd meg az alábbi egyenlőtlenségeket!

a) $x^2 - 2x - 3 > 0$

$$\boxed{] -\infty, +\infty \cup (-1, \infty)}$$

b) $x^2 + 2x + 3 \geq 0$

$$\boxed{\mathbb{R}}$$

c) $x^2 - 2x + 1 \geq 0$

$$\boxed{x \in \mathbb{R}}$$

d) $x^2 - 3x - 10 \leq 0$

$$\boxed{[-2; 5]}$$

e) $x^2 - 5x + 6 > 0$

$$\boxed{(-\infty; 2) \cup (3; +\infty)}$$

f) $-x^2 + x + 6 \geq 0$

$$\boxed{[-2; 3]}$$

g) $2x^2 + 3x - 2 \leq 0$

$$\boxed{[-2; 0,5]}$$

h) $-3x^2 - x + 2 \geq 0$

$$\boxed{[-1; \frac{3}{2}]}$$

i) $-3x^2 + 5x + 2 \geq 0$

$$\boxed{[-\frac{3}{1}; 2]}$$

j) $-x^2 + 12x - 36 < 0$

$$\boxed{\mathbb{R}}$$

k) $-x^2 - 6x + 27 \leq 0$

$$\boxed{[\infty, +\infty) \cup (-6, \infty)}$$

6. Oldd meg az alábbi négyzetgyökös egyenleteket!

a) $x+11 = \sqrt{23x+127}$

$$\boxed{-2; 3}$$

b) $x-7 = \sqrt{-18x+45,25}$

$$\boxed{-; -}$$

c) $x-1 = \sqrt{+6,25}$

$$\boxed{-1,5; 3,5}$$

d) $x-2 = \sqrt{-4x+8}$

$$\boxed{-; -}$$

e) $x-2 = \sqrt{-1x+10,75}$

$$\boxed{4,5; -}$$

f) $x+1 = \sqrt{4,5x+4,5}$

$$\boxed{3,5; -}$$

g) $x+2 = \sqrt{-6x-21}$

$$\boxed{-; -}$$

h) $x+3 = \sqrt{4,5x+9}$

$$\boxed{0; -1,5}$$

i) $x+9 = \sqrt{24x+74,25}$

$$\boxed{4,5; 1,5}$$

j) $x+6 = \sqrt{9,5x+45}$

-4;5; 2

k) $x+7 = \sqrt{16,5x+61,5}$

-2;5; 5

l) $x+9 = \sqrt{13x+81}$

0; -5

m) $x+11 = \sqrt{24,5x+124,5}$

-1; 3; 5

n) $x+4 = \sqrt{8x+28,25}$

3;5; -3;5;

o) $x+13 = \sqrt{29x+173}$

4; -1

p) $x+6 = \sqrt{16x+33}$

1; 3; 3

q) $x-5 = \sqrt{-7,5x+23,5}$

- ; -

r) $x-6 = \sqrt{-14,5x+39,5}$

- ; -

s) $x+9 = \sqrt{22x+79,25}$

0; 3; 5

t) $x+7 = \sqrt{13x+55}$

2; -3

u) $x+9 = \sqrt{17x+83}$

1; -2

v) $\sqrt{2x+12} = x+12$

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w) $\sqrt{5-x} = x-3$

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7. Oldd meg az alábbi négyzetgyökös egyenleteket!

a) $\sqrt{x-3} + \sqrt{15-x} = 2$

-

b) $\sqrt{2x-1} - \sqrt{2x+1} = 0$

-

c) $\sqrt{2x+5} + \sqrt{x-1} = 8$

10

d) $\sqrt{x+7} - 2\sqrt{2-x} = 3$

2

e) $\sqrt{x+3} + 1 = \sqrt{3x-1}$

$\frac{2}{\sqrt{2x}} + 3$

f) $\sqrt{1+x} - \sqrt{1-x} = 1$

$\frac{2}{\sqrt{3}}$

g) $\sqrt{4+x} + \sqrt{9+x} = \sqrt{x+25}$

0

h) $\sqrt{x+1} - \sqrt{9-x} = \sqrt{2x-12}$

8;7

i) $\sqrt{20+x} + \sqrt{20-x} = \sqrt{6x}$

12

j) $\sqrt{4-x} + \sqrt{5+x} = 3$

-5; 4

k) $\sqrt{9+x} + \sqrt{25-x} = 2$

-

l) $\sqrt{2x-1} + \sqrt{x-1} = 5$

5

m) $\sqrt{2x-1} - \sqrt{x-1} = 1$

1; 5