

$$509. \frac{4x-8}{12} - \frac{x+3}{4} + \frac{2x-1}{3} = x-3$$

$$510. \frac{y+5}{2} + \frac{y-1}{5} = 4y-1$$

$$511. \frac{3y+1}{5} + \frac{2y+1}{2} = y + \frac{1}{4}$$

$$512. \frac{t-5}{7} + 2 = \frac{2t-3}{2} - \frac{6t+5}{14}$$

$$513. \frac{t-9}{4} + \frac{2t-1}{6} - \frac{3t+11}{9} = 3$$

$$514. \frac{3}{2} (x-2) = \frac{1}{3} x$$

$$515. 5(x+1) = \frac{1}{3} (x-1)$$

$$516. \frac{5}{6} (3q+9) - (q+11) = \frac{3}{4} (7q+5) - (3q+2)$$

$$517. \frac{1}{2} (4q-5) = \frac{4}{3} (2q-9) + \frac{1}{6} \quad 518. \frac{2(x-1)}{5} + \frac{4(x-3)}{7}$$

$$519. \frac{6(x-4)}{5} - 2 + \frac{2(4x-1)}{3} = 0$$

$$520. \frac{3(x-1)}{5} - \frac{4(x+3)}{7} - \frac{31}{35} = 0$$

$$521. \frac{2v}{3} + \left(\frac{v-2}{3} \right) = 0$$

$$522. \frac{3v+7}{16} - \left(\frac{3v+1}{4} - \frac{v-1}{6} \right) = 1$$

$$523. \frac{3(5x-3,5)}{5} + \frac{5(7x-5,9)}{4} = \frac{7(9x-9,3)}{6} + \frac{2(3x+3,9)}{5}$$

$$524. \frac{x+5}{3x-6} = \frac{1}{2} + \frac{2x-3}{2x-4}$$

$$525. \frac{10}{3} - \frac{7x+2}{6x+18} = 2 + \frac{3x-1}{4x+12}$$

$$526. \frac{9x-5}{3x-2} - \frac{4x+1}{2x-3} = 1$$

$$527. \frac{2}{x-2} = \frac{1}{x+3}$$

$$528. \frac{4x-7}{5x+11} = \frac{8x+1}{10x-3}$$

$$529. \frac{2x-1}{2x+1} + \frac{8}{4x^2-1} = \frac{2x+1}{2x-1}$$

$$530. \frac{4+3x}{4-3x} = \frac{4-3x}{4+3x} + \frac{16}{16-9x^2}$$

$$531. (x+3)^2 - (x-4)^2 = 2x-13$$

$$532. (3x+1)^2 + (4x-3)^2 = 25x(x+4)$$

$$533. (2x-1)^2 + (x+7)^2 = 5x^2 - 9x + 1$$

$$534. (x+2)^2 - (x-3)^2 + (x+4)^2 - (x+1)^2 = 0$$

$$535. \frac{3x^2-5x+2}{3} = \frac{5x^2+2x-7}{5}$$

$$536. \frac{(x-2)^2}{2} - 4 = \frac{(x+1)^2}{2}$$

$$537. \frac{(x-1)^2}{2} - 6 = \frac{(x-2)^2}{2}$$

$$538. \frac{3}{4x^2+20x+25} + \frac{4}{4x^2+4x+1} = \frac{7}{(2x+5)(2x+1)}$$

$$539. \frac{x^2+x+1}{x^3+x^2+x+1} - \frac{x^2-x+1}{x^3+2x^2+1} = \frac{1}{x+1}$$

Zadaci 2.6.

1. Riješi jednađžbe:

- 1) $1 + \frac{x}{2} = \frac{x-1}{3}$;
- 2) $\frac{x}{2} + \frac{x}{3} = 1 - \frac{x-2}{6}$;
- 3) $\frac{x+1}{2} + \frac{x-1}{3} = 1$;
- 4) $1 - \frac{2x-3}{3} = \frac{x}{2} - \frac{x}{6}$;
- 5) $\frac{x-1}{2} - \frac{x-1}{3} = \frac{x+1}{4}$;
- 6) $\frac{2x-3}{3} - \frac{x-1}{2} = 1 - \frac{x}{6}$;
- 7) $2\left(1 - \frac{x-1}{3}\right) = \frac{1}{2}\left(x - \frac{x+2}{3}\right)$.

2. 1) Ako je $y = \frac{1-3x}{1+3x}$, koliko je x ?
- 2) Ako je $y = \frac{p+x}{1+px}$, koliko je x ?
- 3) Ako je $c = \frac{a-b}{1-ab}$, koliko je a ?
- 4) Ako je $\frac{1}{x} = \frac{1}{y} + \frac{1}{z}$, koliko je z ?
- 5) Ako je $c = \frac{mx_1 + nx_2}{m+n}$, izračunaj n .

Riješi jednađžbe:

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

$$8) 1 - \frac{1}{4}\left(\frac{x}{2} - \frac{1}{6}\right) = \frac{1}{8}\left(2 + \frac{2}{3}x\right);$$

$$9) \frac{1}{3}\left(\frac{x}{2} - \frac{2}{3}\right) - \frac{1}{2}\left(1 - \frac{x+6}{6}\right) = \frac{1}{36}.$$

4. 1) $\frac{0.12-x}{0.03} + \frac{0.01+3x}{0.02} = 4\frac{1}{2}$;
- 2) $\frac{x-0.5}{2} + \frac{x-0.25}{4} + \frac{x-0.125}{8} = 0$;
- 3) $\frac{1 - \frac{1-x}{3}}{4} - \frac{2 - \frac{2-x}{5}}{3} = 1\frac{1}{15}$;
- 4) $\frac{3x - \frac{12-x}{15}}{9} - \frac{\frac{9x-3}{5} + 1}{6} = \frac{19}{90}$;
- 5) $\frac{3x + \frac{5x-1}{8}}{3} - \frac{x - \frac{2x-1}{3}}{2} = 5$;
- 6) $\frac{0.4x - \frac{x-0.8}{4}}{5} - \frac{0.3x - \frac{x+1.2}{5}}{4} = 0.45$.
5. 1) $\frac{(x-2)^2}{2} - \frac{(x-3)(2x-5)}{4} = 3 - (x-4)$;
- 2) $\frac{(x+1)(x-2)}{2} - \frac{(2x-3)^2}{8} = 1 + \frac{x}{2}$;
- 3) $1 - \frac{(3x-2)(2x+3)}{3} = \frac{5x}{6} - \frac{(2x-3)^2}{2}$;
- 4) $2x(3x-2) - 3\left[1 - (2-x)(2x+3) - \frac{x-3}{2}\right] = 13$;
- 5) $3\left\{x - \frac{3x-1}{4} - \left[1 - 2\left(x - \frac{x+3}{5}\right)\right]\right\} = 5x-2$;
- 6) $\frac{x}{2} - \left\{\frac{x}{4} - \frac{1}{3}\left[\frac{x}{3} - \frac{1}{4}\left(\frac{x}{2} - 2\right)\right]\right\} = \frac{x}{3}$.
6. 1) $\left(\frac{2x-15}{6}\right)^2 - \left(\frac{2x-3}{6}\right)^2 = 4$;
- 2) $\left(\frac{3x}{2} - \frac{1}{3}\right)^2 - \left(\frac{3x}{2} + \frac{1}{2}\right)^2 = 1\frac{1}{9}$;

- 3) $\left(5x + \frac{1}{2}\right)^2 - \left(4x + \frac{1}{2}\right)^2 = (3x - 1)^2$;
- 4) $\left(5x - \frac{1}{2}\right)^2 - \left(4x - \frac{1}{2}\right)^2 = \left(3x - \frac{1}{3}\right)^2$;
- 5) $\left(\frac{x}{2} - \frac{3}{4}\right)^2 - \left(\frac{x}{2} + \frac{1}{4}\right)^2 = 1\frac{1}{2}$;
- 6) $\left(\frac{3x}{4} - \frac{1}{2}\right)^2 - \left(\frac{x}{4} + \frac{2}{3}\right)^2 = \frac{1}{2}\left(x - \frac{1}{3}\right)^2$;
- 7) $\left(\frac{x}{2} + \frac{3}{4}\right)^2 - \left(\frac{x}{3} - \frac{1}{4}\right)^2 = 5 \cdot \left(1 + \frac{x}{6}\right)^2$.

Riješi sljedeće jednačbe:

7. 1) $\frac{3}{x} - \frac{1}{6-2x} = \frac{2}{3x-x^2}$;
 - 2) $\frac{3}{x-1} = \frac{2-x}{x-x^2} - \frac{1}{2x}$;
 - 3) $\frac{4}{x} - \frac{5}{x-x^2} = \frac{9}{2x-2}$;
 - 4) $\frac{1}{2x} - \frac{1}{1-2x} = \frac{4x}{4x^2-1}$;
 - 5) $\frac{2}{x} + \frac{2}{x^2-x} = \frac{5}{3x-3}$;
 - 6) $\frac{5x-4}{2x-1} - \frac{4x-1}{6x-3} = 1 - \frac{2x+3}{10x-5}$;
 - 7) $\frac{x+3}{2x^2-6x} - \frac{x+3}{3x^2-9x} = \frac{1}{6x}$;
 - 8) $\frac{x+3}{8x^2-2x} - \frac{3x+5}{12x^2+3x} = \frac{1-2x}{16x^2-1}$;
 - 9) $\frac{2x+1}{9x^2-1} - \frac{1}{1-3x} = \frac{7}{6x+2}$;
 - 10) $\frac{2x^2+1}{2x-4x^2} - \frac{1-3x}{6x-3} = \frac{1}{3x}$.
8. 1) $\frac{3x-1}{6x-3} + \frac{1}{4x^2-1} = \frac{x}{2x+1}$;
 - 2) $\frac{x+5}{x^2-5x} - \frac{x-5}{2x^2-10x} = \frac{x+25}{2x^2-50}$;
 - 3) $\frac{x+3}{2x^2-6x} - \frac{x-3}{3x^2+9x} = \frac{x}{6x^2-54}$;

- 4) $\frac{x-1}{2x^2+x} - \frac{2x}{2x^2-x} = \frac{3-2x}{4x^2-1}$;
- 5) $\frac{1}{1-4x^2} + \frac{x+1}{2x^2+x} = \frac{x-1}{2x^2-x}$;
- 6) $\frac{4(x+9)}{5x^2-45} + \frac{x+3}{5x^2-15x} = \frac{x-3}{x^2+3x}$;
- 7) $\frac{3}{10x^2+2x} - \frac{5}{30x^2-6x} = \frac{1}{25x^2-1}$;
- 8) $\frac{3x-1}{12x-15} + \frac{15}{32x^2-50} = \frac{2x+1}{8x+10}$;
- 9) $\frac{2x-1}{6x^2-4x} - \frac{1-3x}{9x^2+6x} = \frac{2}{3x}$;
- 10) $\frac{3x-1}{6x-3} - \frac{1}{1-4x^2} = \frac{x}{2x+1}$.

9. Riješi sljedeće jednačbe u kojima je a parametar, a x nepoznanica:

- 1) $a(a^2 - x) = a - x$;
- 2) $a^2(x - 1) = 2ax - 4$;
- 3) $a^2(x - 1) = x + a$;
- 4) $9a^2(x + 1) = 4 + 6ax$;
- 5) $a^2(x - 1) = ax - 1$;
- 6) $a^2(2x - 1) = -4 - 4ax$.

10. Uz raspravu o ovisnosti rješenja o realnom parametru a riješi jednačbe:

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

o) $(x+7)(x-1) = (x+1)^2$,

p) $(x+2)(x-3) - (x-3)^2 = 0$.

57. Riješite jednađbu:

a) $\frac{x}{x+2} = \frac{1}{2}$,

b) $\frac{3}{2x-3} = \frac{2}{x+5}$,

c) $(x-5):(x+3) = x:(x-1)$,

d) $\frac{x-5}{x+1} - \frac{x-3}{x+2} = 0$,

e) $\frac{1}{2} + \frac{3-x}{5x} = \frac{x+2}{2x}$,

f) $\frac{2}{x} - \frac{3}{5} = \frac{6-x}{3x} - \frac{2}{15}$,

g) $\frac{x+1}{x-1} + \frac{x-1}{x+1} = 2$,

h) $\frac{3x+5}{2x-1} - \frac{x}{1+2x} - 1 = 0$,

i) $\frac{3}{x-1} + \frac{2}{x+1} = \frac{5}{x}$.

58. Riješite jednađbu:

a) $2x - a = 5, \quad a \in \mathbb{R}$,

b) $\frac{x}{3} - 2(a-x) = a, \quad a \in \mathbb{R}$.

59. Prodiskutirajte jednađbu:

a) $ax - 3 = 0, \quad a \in \mathbb{R}$,

b) $ax + a^2 = b^2 - bx, \quad a, b \in \mathbb{R}$,

c) $(a-b)x - a^2 + b^2 = 0, \quad a, b \in \mathbb{R}$.

45. Riješite jednađbu:

a) $2(2x+5)^2 - (x+2)^2 = 7(x+3)^2 + 1$,

b) $\frac{1}{2}\left(x - \frac{1}{3}\right)^2 - \frac{1}{3}(-x+3) = \frac{1}{2}\left(x - \frac{1}{2}\right)^2 - \frac{17}{18}$,

c) $(l-2)^3 - 2l(5-3l) - 2l^2 = l(l-1)^2 + l$,

d) $5x(3x-2) - (1-x)^3 = x(x-3)^2 - 3x(4-6x)$.

46. Nađite a takav da bude:

a) $x = 4$ rješenje jednađbe $x + 2a = 16 + ax - 6a$,

b) $x = 2$ rješenje jednađbe $x + 2a = x - 4 + 2ax$,

c) $x = 1$ rješenje jednađbe $3x - 1 = a - 7 - ax$,

d) $x = -1$ rješenje jednađbe $\frac{2ax-5}{3x+2} = 2 - a + \frac{2}{x}$,

e) $x = -2$ rješenje jednađbe $\frac{7x+2a}{2-x} = -\frac{9}{2} - \frac{a+2}{x}$.

47. Riješite jednađbu:

a) $\frac{2x-1}{2x-4} - \frac{3}{x^2-4} = 1$, b) $\frac{2a}{a+1} + \frac{1}{a^2-1} = 2$,

c) $\frac{1}{6x+30} - \frac{x}{2x^2-50} = \frac{1}{20-4x}$,

d) $\frac{1}{1 + \frac{1}{1-x}} = 3$,

e) $\left(t+1 - \frac{1}{1-t}\right) : \left(t - \frac{t^2}{t-1}\right) = 5$,

f) $\frac{1}{x-3} + \frac{1}{x^2-x-6} + \frac{1}{x^2-4} = \frac{1}{x+2}$,

g) $\frac{4y}{4y^2-1} + \frac{1}{1-2y} = \frac{1}{2y}$,

h) $\frac{1}{1-4x^2} + \frac{1-x}{2x^2-x} + \frac{x+1}{2x^2+x} = 0$.

48. Riješite jednađbu:

a) $x(x-1) = 0$,

b) $(x+2)(x-3) = 0$,

c) $(2x-1)\left(3x + \frac{1}{2}\right) = 0$,

d) $x^2 - 5x = 0$,

e) $x^2 - 9 = 0$,

f) $16x^2 = 49$,

g) $x^2 - 2x + 1 = 0$,

h) $x^2 - x - 2 = 0$,

i) $x^2 + 5x = 6$,

j) $x^3 + 3x^2 + 2x = 0$,

k) $2x^2 - 5x - 3 = 0$,

l) $x^2 + 1 = 0$,

m) $5 + x^2 = 0$.

49. Riješite jednađbu:

a) $\frac{1}{x} + \frac{x}{6} = \frac{7}{6}$,

b) $1 + \frac{1}{x+2} = \frac{5}{6+x-x^2}$,

c) $\frac{1}{x+1} + \frac{2}{x^2-1} = 2$,

d) $\frac{3}{x+2} - \frac{3x-6}{2x-6} \left(\frac{2x-6}{x^2-4} - 2x+6 \right) = -12$,

50. Koji su od sljedećih parova jednačbi ekvivalentni:

a) $x^2 = 9$ i $x = 3$,

b) $(x-1)(x-2) = (x-1)^2$ i $x-2 = x-1$,

c) $(x-3)^2 = (x-3)(x-5)$ i $x-3 = 0$,

d) $\frac{5x-2}{x-1} = \frac{3}{x-1}$ i $5x-2 = 3$,

e) $\frac{x^2-1}{x+1} = 2$ i $x+1 = 0$.

51. Iz zadane veličine odredite:

a) $O = 2r\pi$, $r = ?$,

b) $P = \frac{a \cdot b}{2}$, $a = ?$,

c) $P = \frac{a+c}{2} \cdot v$, $c = ?$,

d) $V = \frac{a^2 \sqrt{3}}{4} \cdot v$, $v = ?$,

e) $v = \frac{s}{t}$, $s = ?$, $t = ?$,

f) $e = 1.6 \cdot 10^{-19} \text{ C}$, $C = ?$,

g) $I = \frac{Q}{t}$, $Q = ?$,

h) $I = \frac{U}{R}$, $R = ?$,

i) $s = \frac{at^2}{2}$, $a = ?$,

j) $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$, $R = ?$,

k) $\frac{1}{f} = \frac{1}{a} + \frac{1}{b}$, $a = ?$,

l) $\frac{1}{C} = \frac{1}{C_1} + \frac{1}{C_2}$, $C_2 = ?$,

m) $R = R_1 + \frac{R_2 R_3}{R_2 + R_3}$, $R_3 = ?$.

52. Diskutirajte rješenje jednačbe (x – nepoznanica):

a) $x + 2 = 2ax - 1$,

b) $3 + a - x = 3ax$,

c) $9x - 16 = a(a - x)$,

d) $mx + 3m = 3x + 6m$,

e) $3x + 9 = a(a - x)$,

f) $a(x - a) + b(x - b) = a^2 - b^2$,

g) $\frac{5-x}{a} + 1 = 2a$,

h) $\frac{ax-1}{a+1} - \frac{ax+1}{a-1} + \frac{2}{a-1} = 0$,

i) $a^2(x-1) - 9 = a(3x-6)$, **j)** $\frac{m(x+1) + n(x-1)}{m(x-1) + n(x+1)} = \frac{m}{n}$.