

EXERCITII APROFUNDARE - ECUATII IN Z

① Rezolvati in  $Z$  ecuatiile:

11/53 cül

$$5(x+3) = 2 \cdot (5x-5)$$

$$5x+15 = 10x-10$$

$$5x-10x = -10-15$$

$$-5x = -25 \quad | \cdot (-1)$$

$$5x = 25$$

$$x = \frac{25}{5}$$

$$x = 5 \in Z$$

$$S = \{5\}$$

d)  $2(-x+5) = -8(3x+2) + 56$

$$-2x+10 = -24x-16+56$$

$$-2x+24x = -16+56-10$$

$$22x = 30 \quad | : 22$$

$$x = \frac{30}{22} \notin Z \Rightarrow S = \emptyset$$

f)  $5(x-2) - 7(x+3) + 35 = 0$

$$5x-10-7x-21+35=0$$

$$-2x+4=0$$

$$-2x = -4 \quad | \cdot (-1)$$

$$2x = 4$$

$$x = 2 \Rightarrow S = \{2\}$$

h)  $(-2x+6)(x+3) = 0$

o. ceva = 0

$$\Rightarrow -2x+6=0 \Rightarrow -2x = -6 \quad | \cdot (-1)$$

$$2x = 6$$

$$x = 3$$

sau  $x+3=0 \Rightarrow x = -3$

$$S = \{-3; 3\}$$

12/53

b)  $|2x-1| = 17$

$$|17| = 17, \quad |-17| = 17$$

$$2x-1 = 17 \quad \text{sau} \quad 2x-1 = -17$$

$$2x = 17+1$$

$$2x = -17+1$$

$$2x = 18$$

$$2x = -16$$

$$x = \frac{18}{2}$$

$$x = -\frac{16}{2}$$

$$x = 9$$

$$x = -8$$

$$S = \{9, -8\}$$

$$12. d) -4 \cdot |2x-1| + 2 = -|2x-1| - 7$$

$$-4 \cdot |2x-1| + |2x-1| = -7 - 2$$

$$-3 \cdot |2x-1| = -9 \quad | \cdot (-1)$$

$$3 \cdot |2x-1| = 9 \quad | : 3$$

$$|2x-1| = 3 \Rightarrow 2x-1 = 3$$

$$2x = 3 + 1$$

$$2x = 4$$

$$x = 2$$

$$2x-1 = -3$$

$$2x = -3 + 1$$

$$2x = -2$$

$$x = -1$$

$$13. e) \underline{x(x+1)} = x^2 + 2x + 1 \quad \left| S = \{2, -1\} \right.$$

$$x^2 + x = x^2 + 2x + 1$$

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

$$-x = 1 \quad | \cdot (-1)$$

$$x = -1 \Rightarrow S = \{-1\}$$

$$14. i) 14 - |-x+4| = 8$$

$$-|-x+4| = 8 - 14$$

$$-|-x+4| = -6 \quad | \cdot (-1)$$

$$|-x+4| = 6 \Rightarrow -x+4 = 6 \quad -x+4 = -6$$

$$-x = 6 - 4$$

$$-x = 2 \quad | \cdot (-1)$$

$$x = -2$$

$$-x = -6 - 4$$

$$-x = -10 \quad | \cdot (-1)$$

$$x = 10$$

$$S = \{-2; 10\}$$

$$15. d) -4 - \{6 - [-3 + (-3) + (-5 - x) - 7] - 9\} = 1$$

$$-4 - [6 - (\underline{-3} - \underline{3} - \underline{5} - x - \underline{7}) - 9] = 1$$

$$-4 - [6 - (-18 - x) - 9] = 1$$

$$-4 - [6 + 18 + x - 9] = 1$$

$$-4 - [15 + x] = 1$$

$$-4 - 15 - x = 1$$

$$-19 - x = 1$$

$$-x = 1 + 19$$

$$-x = 20 \quad | \cdot (-1)$$

$$x = -20$$

$$S = \{-20\}$$

17/59.  $x, y \in \mathbb{Z}, x, y = ?$

a)  $(x+3)(y-1) = 0 \Rightarrow x+3=0 \Rightarrow x=-3$

o. cerva = 0

$y-1=0 \Rightarrow y=1$

b)  $xy - 2x = -7$

$x \cdot (y-2) = -7$

$1 \cdot (-7) = (-7) \cdot (1) = -1 \cdot 7 = 7 \cdot (-1)$

}  $\Rightarrow$  I)  $x=1$   
 $y-2=-7 \Rightarrow y=-7+2$   
 $y=-5$

II)  $x=-7$

$y-2=1 \Rightarrow y=3$

III)  $x=-1$

$y-2=7 \Rightarrow y=7+2=9$

$(x, y) \in \{(1, -5), (-7, 3), (-1, 7), (7, 1)\}$

IV)  $x=7$

$y-2=-1 \Rightarrow y=-1+2$   
 $y=1$

c)  $\frac{1}{3x-1} = \frac{1}{2} \Rightarrow (3x-1) \cdot 1 = 1 \cdot 2$

$3x-1=2$

$3x=2+1$

$3x=3 \Rightarrow x=1 \Rightarrow S = \{1\}$

d)  $(x+3)^2 + [(x+3)(x-2)]^2 = 0$

$\begin{matrix} \parallel \\ P \cdot P \\ \geq 0 \end{matrix}$

$\begin{matrix} \parallel \\ P \cdot P (\geq 0) \end{matrix}$

$0 + 0 = 0$

$\Rightarrow (x+3)^2 = 0 \Rightarrow x+3=0 \Rightarrow x=-3$

$[(x+3)(x-2)]^2 = 0 \Rightarrow (x+3)(x-2)=0 \Rightarrow x+3=0 \Rightarrow x=-3$   
 $x-2=0 \Rightarrow x=2$

$S = \{-3\}$

-(4)-

20/54.  $x \in \mathbb{Z} = ?$

a)  $x^2 - 1 = 0$

$x^2 = 1$

$x = \pm 1$

$S = \{1; -1\}$

b)  $3x^2 - 27 = 0$

$3x^2 = 27$

$x^2 = 9$

$x = \pm 3$

$S = \{3; -3\}$

c)  $-x^2 + 4 = 0$

$-x^2 = -4 / \cdot (-1)$

$x^2 = 4$

$x = \pm 2$

$S = \{2; -2\}$

21/54.  $x \in \mathbb{Z} = ?$

a)  $|-x+5| = -10$

modulul este in totdeauna  $\geq 0$

$\Rightarrow S = \emptyset$

b)  $|-x+1| + (x+y)^2 = 0$

$\Rightarrow |-x+1| = 0$   
 $-x+1 = 0$   
 $-x = -1 / \cdot (-1)$   
 $x = 1$

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

$(x,y) \in \{(1; -1)\}$

27/54.  $x, y \in \mathbb{Z} = ?$

$xy - 3x + 2y = 1$

$xy - 3x = 1 - 2y$

$x(y-3) = 1 - 2y$

$x = \frac{1-2y}{y-3} \in \mathbb{Z} \Rightarrow y-3 | 1-2y$

$\Rightarrow y-3 | 1-2y+4y-6$   
 $y-3 | 1-2y-6$   
 $y-3 | -5 \Rightarrow$

$\Rightarrow y-3 \in D_5 \Rightarrow y-3 \in \{1, -1, 5, -5\} / +3$

$y \in \{4, 2, 8, -2\}$

$y=4 \Rightarrow x = \frac{1-2 \cdot 4}{4-3} = \frac{-7}{1} = -7$

$y=8 \Rightarrow x = \frac{1-2 \cdot 8}{8-3} = \frac{-15}{5} = -3$

$y=2 \Rightarrow x = \frac{1-2 \cdot 2}{2-3} = \frac{-3}{-1} = 3$

$y=-2 \Rightarrow x = \frac{1-2 \cdot (-2)}{-2-3} = \frac{5}{-5} = -1$

$$(x, y) \in \{(-7, 4), (3, 2), (-3, 8), (-1, -2)\}.$$

TEMA - până luni: alegere - pag 53/

ex: 11 - I coloană

ex 12, 13, 14 - I coloană

pag 54/ 18 - tot

20 d, e, f.

Pentru olimpici - Supermate.