Mathematics Marathon 06/08/2023 Tasks

Equation with a modulus

№ 1...8

1. $x^2 - 6x = 6$

$x^2 - 5x = -6$

$\underset{a}{x^2} \underset{b}{-5x} \underset{c}{-6} = 0$

$x^2 - 5x + 6 \cdot 0 = 0$

1) $a = 1, \quad b = -5, \quad c = -6$

$$x = [-b \pm \sqrt{D}] / 2a$$

$$x = [-5 \pm \sqrt{25}] / 2 \cdot 1$$

$$x = [-5 \pm 5] / 2 \cdot 1$$

$$x = -10 / 2$$

$$x = -5$$

$$x = [-5 + 5] / 2$$

$$x = 0$$

$$x = -5, \quad y = 0 \quad X$$

$$D = b^2 - 4ac$$

$$D = (-5)^2 - 4 \cdot 1 \cdot (-6)$$

$$D = 25 + 24$$

$$D = 49$$

$$x = [-5 \pm \sqrt{49}] / 2$$

$$x = [-(-5) + 7] / 2 = 5 + 7 / 2 = 6$$

$$x = [(-5) - 7] / 2 = -2 / 2 = -1$$

$$\ast \quad x = 6, \quad x = -1$$

$$|x| = x + 2$$
$$x = x + 2$$
$$-x = x + 2$$
$$-2x = 2$$
$$x = -1$$
$$0 \neq 2.$$
$$0: -1$$

3. $2|x+1| + 1 = 3$

$$|2x + 2| + 1 = 3$$
$$-2x + 2| + 1 = 3$$

$$2|x| = 2 \quad x =$$
$$-2x = 0$$

$$2|x + 1| = 2$$
$$|x + 1| = 1$$
$$x = 0$$

$$x + 1 = -1$$
$$x = -2.$$
$$0: -2, 0$$