

Mathematics Marathon 30/07/2023 Tasks

Polynomial Simplifications

30.07.23

$$N_2^0 = 1, 3, 4, 6, 7$$

$$N_2^0 = 2, 6, 14, 16$$

$$N_2^0 = 1$$

$$1. 40 - 9 \cdot (1 - 3)^2 = 40 - 9 \cdot 4 = 40 - 36 = 4$$

$$3. 2^4 - 2^3 - 4 \cdot 2 + 18 = 16 - 8 - 8 + 18 = 18$$

$$2^4 - 2^3 - 4 \cdot 2 + 18 = 16 - 8 - 8 + 18 = 18$$

$$4. 9(3 + 2 + 2) = 9 \cdot 7 = 63$$

7.

$$8. (x - 7)x = x^2 - 7x$$

$$7. \frac{8x^2y}{4xy} = \frac{4x \cdot 2x}{4xy} = 2x$$

$$2 \cdot 5 \cdot (-5)^2 + 16 \cdot (-5) + 1 - 3 \cdot (-5)^2 - 8 \cdot (-5)^2 + 7 =$$

$$= 5 \cdot 25 - 80 + 1 - 75 - 120 + 7 = -142$$

$$5(-5)^2 + 16(-5) + 1 - 3(-5)^2 \leftarrow 8(-5) + 7 = 5 \cdot 25 - 80 + 1 - 75 + 40 + 7 =$$

$$= 125 - 80 + 1 - 75 + 40 + 7 = 18$$

$$(5x^2 - 3x^2) + (16x - 8x) + 8 =$$

$$= 2x^2 + 8x + 8 = 2 \cdot 25 + 40 + 8 =$$

$$= 18.$$

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

$$= 3x^2 - 5x + 2 + x^2 + 4x - 1 =$$

$$= (3x^2 + x^2) + (-5x + 4x) + 1 =$$

$$= (4x^2 + x + 1) = 4 \cdot 25 + 5 + 1 =$$

$$= 106$$

$$3x^2 - 5x + 2 + (-1)(x^2 - 4x + 1) =$$

$$3x^2 - 5x + 2 - 1(x^2 - 4x + 1) =$$

$$= 3x^2 - 5x + 2 - x^2 + 4x - 1 =$$

$$= 2x^2 - x + 1 = 2 \cdot 25 - 5 + 1 =$$

$$50 - 4 = 46.$$

$$14. (2m - 3n)^2 = (2m)^2 - 2 \cdot (2m \cdot 3n) +$$

$$+ 3n^2 = 4m^2 - 12mn + 9n^2$$

$$16. \frac{9xy - 6x^2}{3x} \quad \cancel{x \cdot 3x} \quad \cancel{(3x)} = \frac{3x \cdot 3y - 6x^2}{3x} \cdot 2$$

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

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