

2. Algebraic expressions , equations, inequalities

Task 2.1. (T 16.2015, 0 – 4 pts)

Write down each of the following as an algebraic expression.

- a) the cube of the sum of a and b .

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- b) the difference of a squared and b squared

- c) the quotient of the absolute value of a doubled and b

- d) the cube root of the absolute value of the quotient of a and b

Task 2.2. (T 4.2016)

If $m = \frac{1-x^2}{x+1}$, $n = x - 1$, where $x \neq -1$ then the difference between m and n equals

A. 0

B. $2 - 2x$

C. $-2x$

D. $\frac{-x^2-x+2}{x+1}$

Task 2.3. (T 19.2016, 0 – 2 pts)

The equation $mx^2 + 2x - 1 = 0$ is solved for x . Complete the following sentences.

- a) If $m = -1$, then the number of solutions to this equation is

- b) If the number $x_0 = \frac{1}{2}$ is the solution to this equation then $m =$

Task 2.4. (T 3.2017)

If $m = 5$ and $n = 4$, then the difference of squares of m and n is:

A. 41

B. 1

C. 81

D. 9

Task 2.5. (T 4.2017)

$\begin{cases} 2x + y = 3 \\ 4x - 5y = -1 \end{cases}$ is a system of equations which is represented in two-dimensional system of coordinates by:

- A. an infinite set

- B. an empty set.

- C. exactly two distinct points.

- D. exactly one point.

Task 2.6. (T 5. 2017)

The sum of all roots of the equation $(x - 3)(x - 2)(x + 6) = 0$ is:

- A. -1 B. 1 C. -11 D. 11

Task 2.7. (T 11.2018)

The set of all real numbers x which satisfy the inequality: $-3 < 2x - 1 < 3$ is

- A. $(-3; 3)$ B. $\langle -3; 3 \rangle$ C. $(-1; 2)$ D. $\langle -1; 2 \rangle$

Task 2.8. (T 2.2019)

For each real number x and for each real number y the square of the difference $(x^2 - 5y)^2$ equals:

- A. $x^4 - 10x^2y + 25y^2$ B. $-x^4 + 10x^2y - 25y^2$
C. $x^4 + 25y^2$ D. $x^4 - 25y^2$

Task 2.9 (T 3.2019)

The set of simultaneous equations $\begin{cases} 3x + 5y = -1 \\ x - 11y = 6 \end{cases}$ in a set of coordinate axes:

- A. describes an infinite set. B. describes an empty set.
C. describes exactly two distinct points. D. describes exactly one point.

Task 2.10 (T 2.2020)

The product of all solutions of the equation $(x - 1)(x + 2)(x - 3) = 0$ is:

- A. -6 B. -2 C. 2 D. 6

Task 2.11 (T 3.2020)

If $x + y = 25$ and $x - y = -4$, then $x^2 - y^2$ equals:

- A. -100 B. -29 C. 29 D. 100

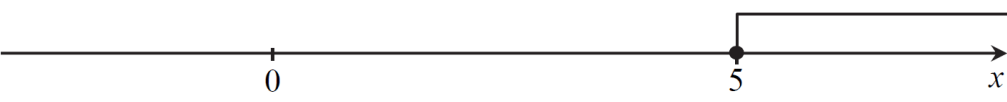
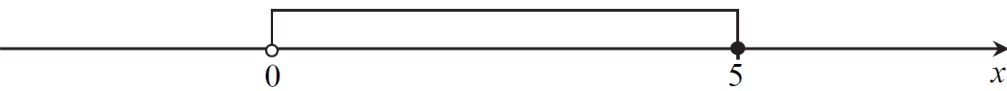
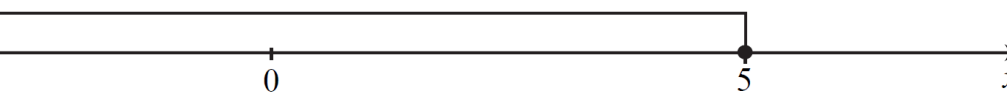
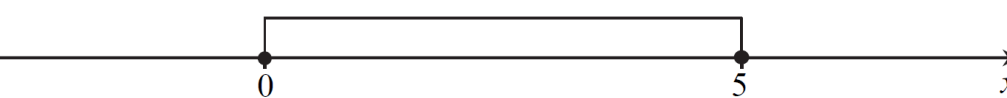
Task 2.12. (T 8.2020)

The expression $2(x - 3) - 5x(3 - x)$ can be written as:

- A. $-10x(x - 3)$ B. $10x(x - 3)$
 C. $(5x - 2)(x - 3)$ D. $(5x + 2)(x - 3)$

Task 2.13. (T 9.2020)

The solution set for the inequality $2 - \frac{2}{3}(x - 1) \geq -\frac{2}{3}$ is the interval:

- A. 
- B. 
- C. 
- D. 

Task 2.14 (T 18.2020, 0 – 2 pts)

The geometrical interpretation of the set of simultaneous equations

$$\begin{cases} x + y = 2 \\ x + (1 + m)y = 1 \end{cases}$$

with the unknowns x and y are:

- a) two parallel lines, when m equals
 b) two perpendicular lines, when m equals

Task 2.15 (T 1.2021)

The square of the difference of $3x$ and y , minus the square of the sum of x and $3y$ is

- A. $8x^2 + 8y^2 - 12xy$ B. $8x^2 - 8y^2$
 C. $8x^2 - 8y^2 - 12xy$ D. $8x^2 + 8y^2$

Task 2.16 (T 3.2021)

The solution for the inequality

$$\frac{x-2}{2} - \frac{9-x}{3} > \frac{1}{6}x - 10$$

is

- A. $(-9; +\infty)$ B. $(-\frac{36}{11}; +\infty)$ C. $(\frac{7}{2}; +\infty)$ D. R

Task 2.17. (T 4.2021)

The greatest real root of the equation $x(x + 1)(3x + 4) = 0$ is

- A. 1 B. 0 C. 2 D. $-\frac{4}{3}$

Task 2.18 (T 3.2023)

Complete the sentence. Select the correct answer from the options given below.

The number of all real solutions of the equation $x(x^2 + 1)(x - 2) = 0$ is

- A. 1 B. 2 C. 3 D. 4

Task 2.19 (T 4.2025)

The numbers $x = 5 - 2\sqrt{2}$ and $y = 2 - 5\sqrt{2}$ are given.

Complete the sentence. Choose the correct answer from the options given below.

The absolute value of the difference of the squares of the numbers x and y is equal to

- A. 21 B. $79 + 40\sqrt{2}$ C. 63 D. $21 + 40\sqrt{2}$

Task 2.20 (T 5.2025)

One of the solutions of the equation $x \cdot (x^2 - 4x + m) = 0$ with the unknown x is the number 2.

Complete the sentence. Choose the correct answer from the options given below.

The number m is equal to

- A. -4 B. -2 C. 2 D. 4