5. Analytic geometry

Task 5.01. (0-1)   (2015– task 06)

The points $K = (1,3)$, $L = (-3,2)$, $M = (-2,-2)$, $N = (2,-1)$ are the vertices of a square. The area of the square is

A. $\sqrt{17}$ B. 17   C. $\sqrt{34}$ D. 34

Task 5.02. (0-1)   (2015 – task 08)

The line k passes through the point $S = (-3,1)$ and is perpendicular to the line l with the equation $y = -\frac{1}{3}x + 12$. The line k has the following equation:

A. $y = -\frac{1}{3}x$ B. $y = 3x$ C. $y = -\frac{1}{3}x - \frac{8}{3}$ D. $y = 3x + 10$

Task 5.03. (0-1)   (2016 – task 11)

The straight lines $2x + 3y - 11 = 0$ and $y = ax$ are perpendicular when

A. $a = -\frac{1}{2}$ B. $a = \frac{2}{3}$ C. $a = \frac{3}{2}$ D. $a = 2$

Task 5.04. (0-1)   (2017 – task 10)

Line k with the equation $y = -\frac{1}{3}x + 11$ is parallel to the line l which contains $K = (-3,9)$. The equation of the line l is:

A. $y = -\frac{1}{3}x + 10$ B. $y = -\frac{1}{3}x + 8$ C. $y = 3x + 18$ D. $y = 3x$

5. Analytic geometry

Task 5.05. (0-3)   (2017 – task 19)

Two points, $M = (-5, -3)$ and $N = (3, 11)$, are located on the Cartesian plane.

Complete the following sentences.

(a) The equation of the line MN is …………………..……………………… .

(b) The distance of point M from point N is ……………………… .

(c) The midpoint of the segment MN is $S = (x_S, y_S)$, where $x_S =$ …………

and $y_S =$ …………

Information for task 5.6 – 5.8:

Given are points $A(-2, 1)$ and $B(3,4)$.

Task 5.06. (0-1)   (2018 – task 01)

The length of the line segment AB is equal to

A. $\sqrt{34}$ 　　　　　 B. $\sqrt{50}$ 　　　　　 C. $\sqrt{10}$ 　　　　　 D. $\sqrt{26}$

Task 5.07. (0-1)   (2018 – task 02)

Points A and B lie on the line

A. $y = \frac{3}{5}x + \frac{1}{5}$ 　　　 B. $y = \frac{3}{5}x + \frac{11}{5}$ 　　　 C. $y = \frac{5}{3}x + \frac{11}{3}$ 　　　 D. $y = \frac{5}{3}x + \frac{7}{3}$

Task 5.08. (0-1)   (2018 – task 03)

The centre of the line segment AB is the point

A. $S = \left(\frac{1}{2}, \frac{3}{2}\right)$ 　　　 B. $S = \left(\frac{5}{2}, \frac{3}{2}\right)$ 　　　 C. $S = \left(\frac{5}{2}, \frac{1}{2}\right)$ 　　　 D. $S = \left(\frac{1}{2}, \frac{5}{2}\right)$

5. Analytic geometry

Task 5.09. (0-1)   (2018 – task 04)

The line l passes through the point $A = (-5,6)$ and is parallel to the line k given by the equation $y = 2x - 7$. The line l has the following equation:

A. $y = -\frac{1}{2}x + \frac{7}{2}$ **B.** $y = -\frac{1}{2}x + \frac{17}{2}$ **C.** $y = 2x - 4$ **D.** $y = 2x + 16$

Task 5.10. (0-1)   (2019 – task 07)

The line m passes through the point $K = (-2,19)$ and is perpendicular to the line l given by the equation $y = \frac{1}{8}x + 2019$. The equation of the line m is:

A. $y = -8x + 3$ **B.** $y = -8x + 150$

C. $y = -\frac{1}{8}x + \frac{75}{4}$ **D.** $y = -\frac{1}{8}x + \frac{3}{8}$

Task 5.11. (0-4)   (2019 – task 18)

Points $A = (8, -1)$, $B = (-4, -23)$, and $K = (1, 9)$ are located on a Cartesian plane. The point S is the midpoint of the line segment AB. The line m is parallel to the line AB and passes through the point K.

Complete the following sentences. Enter the correct numbers in sentences (a) and (b), and write the equation of the line in sentences (c) and (d).

   (a) The first coordinate of the point S equals ……………, and the second coordinate of this point is …………… .

   (b) The distance between points A and B equals …………… .

   (c) The line AB has the equation ………………………… .

   (d) The line m has the equation ………………………… .

5. Analytic geometry

Task 5.12. (0-3)   (2020 – task 20)

Point $A = (-1, 2)$ is the end point of a line segment AB, whereas point $S = \left(1, \frac{1}{2}\right)$ is the midpoint of the line segment AB. Complete the following sentences.

   (a) The coordinates of point B are: ……………………………… .

   (b) The line segment AB is reflected in x-axis. The coordinates of the endpoints of the
       image of AB after reflection are: $A' = ($....... , ...$)$, $B' = ($....... , ...$)$.

   (c) The length of the line segment AB is …......………………………………… .

Task 5.13. (0-5)   (2021 – task 17)

The triangle ABC is a right-angled triangle. The length of the hypotenuse AC is equal to 65. The vertex A has coordinates $(-15, 20)$, the vertex B is at the origin of the coordinate system, and the vertex C has both coordinates positive.

Complete the sentences a–c below by writing the correct numeric values in the blanks.

   (a) The length of the shortest side of the triangle ABC is equal to ....

   (b) The area of the triangle ABC is equal to ....

   (c) The radius of the circle circumscribed on the triangle ABC is equal to ....

Write the equation of the straight line $\boldsymbol{BC}$.

   (d) The straight line BC has the equation ....

Write the coordinates of the centre of the circle circumscribed on the triangle $\boldsymbol{ABC}$.

   (e) The centre of the circle circumscribed on the triangle ABC has coordinates
      ....

5.11