Контрольная работа #2

Задача 1

$8x + 12y = -5$ $\quad \vec{n}(8; 12)$

Задача 2

$\begin{cases} x = -8 - t \\ y = 2 - 13t \end{cases}$ $\quad \begin{cases} x = -13 + 5t \\ y = -13 + 5t \end{cases}$

-

Задача 8

$A(12\sqrt{2}, 24)$ $\quad y = \pm 2x$

$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$

$\frac{(12\sqrt{2})^2}{1} \cdot k - \frac{24^2}{4} k = 1$

$\frac{288}{1} \cdot k - \frac{576}{4} k = 1$

$1152k - 576k = 4$

$k = \frac{4}{576} = \frac{1}{144}$

$x^2 \cdot \frac{1}{144} - \frac{y^2}{576} = 1$

$a = 12 \quad b = 24$

Задача 10

$x^2 - 2xy - 3\sqrt{2}x + y^2 - 3\sqrt{2}y = 0$

$a_{11}x^2 + 2a_{12}xy + 2a_{13}x + a_{22}y^2 + 2a_{23}y + a_{33} = 0$

$a_{11} = 1 \; ; \; a_{12} = -1 \; ; \; a_{13} = -\frac{3\sqrt{2}}{2} \; ; \; a_{22} = 1 \; ;$

$a_{23} = -\frac{3\sqrt{2}}{2} \qquad a_{33} = 0$

$\det \begin{vmatrix} a_{11} & a_{12} \\ a_{12} & a_{22} \end{vmatrix} = \begin{vmatrix} 1 & -1 \\ -1 & 1 \end{vmatrix} = 0$

$x^* = x'\cos\varphi - y'\sin\varphi \qquad y^* = x'\sin\varphi + y'\cos\varphi$

$x'^2\cos^2\varphi - 2x'y'\cos\varphi\sin\varphi + y'^2\sin^2\varphi -$
$- 2(x'\cos\varphi - y'\sin\varphi)(x'\sin\varphi + y'\cos\varphi) +$
$x'^2\sin^2\varphi + 2x'y'\sin\varphi\cos\varphi + y'^2\cos^2\varphi + \ldots$

$-2x'y'\cos\varphi\sin\varphi + 2x'y'\sin\varphi\cos\varphi + x'y'\cos^2\varphi - y'x'\sin^2\varphi$

$x'y'(\cos^2\varphi - \sin^2\varphi) = 0 \quad / : \sin^2\varphi$

$\operatorname{ctg}^2\varphi = 1 \qquad \varphi = \frac{\pi}{4}$

Zagara 5

$F_1 = (-59, -5)$ $F_2(53, -5)$ $x = \frac{4057}{56}$

$|F_1F_2| = \sqrt{(59+53)^2} = 112$ $c = 56$

$d_1 = \frac{(59+53)}{2} - 59 = -3$

$d = \frac{4057}{56} + 3 = 75{,}44$

$a\sqrt{dc} = \sqrt{75 \cdot 56} = 64{,}8$

$b = \sqrt{a^2 - c^2} = \sqrt{4199{,}04 - 3136} \approx 32{,}6$

Zagara 6

$-4x^2 - 8x - 2y^2 - 12y - 2 = 0$

~~$\cdot(-4)$~~

$4x^2 + 8x + 2y^2 + 12y + 2 = 0$

~~$(4x^2 + 8x + 4) + 2y^2 + 12y +$~~

$2x^2 + 4x + y^2 + 6y + 2$

$(2x^2 + 4x + 2) + (y^2 + 6y + 9) - 9 = 0$

$(\sqrt{2}x + \sqrt{2})^2 + (y+3)^2 - 9 = 0$

$(\sqrt{2}(x+1))^2 + (y+3)^2 = 9$

$\frac{2(x+1)^2}{9} + \frac{(y+3)^2}{9} = 1$ $\quad [-1;-3)$

zagara 7

$F(0,0)$ $\quad x = -8$

$d_1 = FF = \sqrt{x^2+y^2}$ $\quad x^2+y^2 = (x+8)^2$

$d_2 = x+8$ $\quad y^2 = x^2+16x+64-x^2$

$y^2 = 16(x+4)$

$x = -4 + (-p/2)$

$-8 = -4(-p/2)$

$2 = -p/2$

$-\frac{p}{2} = 2$ $\quad p = -4$

задача 9

$z = -\sqrt{2} + \sqrt{x^2+y^2+1}$

$(z+\sqrt{2})^2 = (\sqrt{x^2+y^2+1})^2$

~~$z^2 + 2\sqrt{2}z$~~

$(z+\sqrt{2})^2 = x^2+y^2+1$

$x^2+y^2-(z+\sqrt{2})^2 = -1$

~~Это параболоид~~

Двухполостный гиперболоид

задача 2

$\begin{cases} x = -8 - t \\ y = 2 - 13t \end{cases}$ $\quad\quad$ $\begin{cases} x = -13 + 5t \\ y = -13 + 5t \end{cases}$

$\frac{x+8}{-1} = \frac{y-12}{-13}$ $\quad\quad$ $\frac{x+13}{5} = \frac{y+13}{5}$

$\begin{cases} -13(x+8) = -1(y-12) \\ 5(x+13) = 5(y+13) \end{cases} \Rightarrow \begin{cases} 13(x+8) = y - 12 \\ x + 15 = y + 15 \end{cases}$

$13x + 104 = x - 12$

$12x = -116$

$y = x + 9,6$

$A(-1, 1)$ $\vec{o}(-5, -4)$ $a = -5$ $b = -4$ $\varphi = \frac{\pi}{4}$

$$\begin{cases} x = x' + a \\ y = y' + b \end{cases} \quad \begin{cases} x' = x - a \\ y' = y - b \end{cases} = \begin{cases} x' = -6 \\ y' = -3 \end{cases}$$

2) $$\begin{cases} x'' = x' \cos\varphi + y' \sin\varphi \\ y'' = -x' \sin\varphi + y' \cos\varphi \end{cases}$$

$$\Rightarrow \begin{cases} x'' = -6 \cdot \frac{\sqrt{2}}{2} + (-3) \cdot \frac{\sqrt{2}}{2} \\ y'' = 6 \cdot \frac{\sqrt{2}}{2} - 3 \cdot \frac{\sqrt{2}}{2} \end{cases}$$

$x'' \approx -3\sqrt{2} - 1{,}5\sqrt{2} = -4{,}5\sqrt{2} \approx -6{,}5$

$y'' \approx 3\sqrt{2} - 1{,}5\sqrt{2} = 1{,}5\sqrt{2} \approx 2{,}12$

Zagara 4