

ДЗ Кривые и поверхности второго порядка.

Задача 1,2,4. Определить тип кривой по заданному уравнению, привести к каноническому виду и построить кривую, найти координаты фокусов. Для эллипса и гиперболы определить эксцентриситет, составить уравнения асимптот для гиперболы; для параболы найти значение параметра, составить уравнения директрисы.

Задача 3. Привести каждое уравнение поверхности к каноническому виду и построить кривую.

Задача 5. Написать уравнение поверхности, полученной вращением заданной кривой вокруг заданной оси. Сделать рисунок поверхности.

Задача 6. Привести каждое уравнение поверхности к каноническому виду и построить поверхность методом сечений.

**Кривые второго порядка.
К задачам 1-4.**

№зад.	Вариант 1.	№зад.	Вариант 2.
1.	$100x^2 - 50y^2 + 20x + 40y + 493 = 0$	1.	$50x^2 - 25y^2 + 20x + 30y + 93 = 0$
2.	$y^2 - 8x + 6y + 17 = 0$	2.	$10x^2 - 20x - y + 7 = 0$
3.	$\sqrt{5} \cdot x = -3\sqrt{5} + 3\sqrt{9 + 2y - y^2}$	3.	$\sqrt{2x} = -4\sqrt{2} - \sqrt{25 - 10y - y^2}$
4.	$x^2 + 4y^2 + 10x - 24y + 61 = 0$	4.	$8x^2 - 4y^2 - 8x + 12y - 7 = 0$
№зад.	Вариант 3.	№зад.	Вариант 4.
1.	$125x^2 - 100y^2 - 50x - 60y + 496 = 0$	1.	$4x^2 - y^2 - 4x + 2y + 36 = 0$
2.	$y^2 - 3x - 10y + 34 = 0$	2.	$16x^2 - 32x - y + 15 = 0$
3.	$2x = 1 + \sqrt{-16y^2 - 48y - 35}$	3.	$5x = -1 - \sqrt{120y - 100y^2 - 35}$
4.	$x^2 - y^2 - 16x + 14y + 15 = 0$	4.	$4x^2 + 9y^2 - 8x + 36y + 76 = 0$
№зад.	Вариант 5.	№зад.	Вариант 6.
1.	$x^2 - 4y^2 - 4x + 56y - 152 = 0$	1.	$9x^2 - 4y^2 - 54x + 8y + 78 = 0$
2.	$15y^2 - x - 30y + 10 = 0$	2.	$y^2 + 9x - 14y + 85 = 0$
3.	$x = 2 + \sqrt{28 - 2y^2 + 4y}$	3.	$3y = 3 - \sqrt{45 - 5x^2 - 30x}$
4.	$2x^2 + y^2 - 20x - 2y + 51 = 0$	4.	$11x^2 - 9y^2 + 66x + 90y - 126 = 0$
№зад.	Вариант 7.	№зад.	Вариант 8.

1.	$20x^2 - 16y^2 + 20x - 155 = 0$	1.	$x^2 - 6y^2 - 24x + 120y - 420 = 0$
2.	$x^2 - 24x + 4y + 140 = 0$	2.	$y^2 - x - 8y + 13 = 0$
3.	$y = -5 + \sqrt{45 + 30x - 5x^2}$	3.	$4y = -6 - \sqrt{4x - x^2}$
4.	$x^2 + y^2 - 2x - 16y + 65 = 0$	4.	$9x^2 - 25y^2 + 50y - 25 = 0$
№зад.	Вариант 9.	№зад.	Вариант 10.
1.	$x^2 - 4y^2 - 6x - 20y = 0$	1.	$4x^2 + y^2 + 16x + 10y + 5 = 0$
2.	$9y^2 + 4x - 12y + 28 = 0$	2.	$3x^2 + 12x + 12y = 0$
3.	$10y = 6 + \sqrt{-10x - 25x^2}$	3.	$\sqrt{2}y = \sqrt{2} - \sqrt{26 + 4x - x^2}$
4.	$x^2 - 9y^2 - 16x - 36y + 28 = 0$	4.	$x^2 - 16y^2 + 14x - 64y - 15 = 0$
№зад.	Вариант 11.	№зад.	Вариант 12.
1.	$16x^2 + 9y^2 - 32x + 18y - 119 = 0$	1.	$x^2 - y^2 - 16x + 14y + 31 = 0$
2.	$x^2 - 16x - 8y + 8 = 0$	2.	$y^2 - 10x - 8y + 26 = 0$
3.	$4x = 6 + \sqrt{8y^2 - 40y + 49}$	3.	$2\sqrt{2}y = 5\sqrt{2} + \sqrt{16x^2 - 48x + 35}$
4.	$x^2 - 5y^2 + 12x + 30y - 9 = 0$	4.	$x^2 + 2y^2 - 6x + 8y + 33 = 0$
№зад.	Вариант 13.	№зад.	Вариант 14.
1.	$5x^2 + 9y^2 + 50x - 18y + 44 = 0$	1.	$4x^2 - 9y^2 - 8x - 18y - 6 = 0$
2.	$30x^2 - 60x - y + 29 = 0$	2.	$3y^2 - 2x + 6y + 1 = 0$
3.	$x = -2 - \sqrt{2y^2 - 12y + 8}$	3.	$\sqrt{2}y = 3\sqrt{2} - \sqrt{x^2 - 4x + 14}$
4.	$x^2 - 9y^2 - 18x + 81 = 0$	4.	$9x^2 + 4y^2 - 54x - 20y + 106 = 0$
№зад.	Вариант 15.	№зад.	Вариант 16.
1.	$9x^2 - 10y^2 + 72x + 60y + 144 = 0$	1.	$9x^2 + 25y^2 + 54x - 100y - 44 = 0$
2.	$x^2 + 16x - 2y + 66 = 0$	2.	$4y^2 - 16x - 4y + 17 = 0$
3.	$3x = 15 + \sqrt{460 + 40y + 4y^2}$	3.	$2y = -10 + \sqrt{9x^2 - 90x - 135}$
4.	$x^2 - y^2 - 4x - 10y - 21 = 0$	4.	$x^2 - 4y^2 - 10x - 24y - 11 = 0$
№зад.	Вариант 17.	№зад.	Вариант 18.

1.	$x^2 - 4y^2 + 10x - 24y - 15 = 0$	1.	$x^2 - 4y^2 + 4x + 12y + 11 = 0$
2.	$x^2 - 18x + 8y + 73 = 0$	2.	$5x^2 - 20x + 2y + 8 = 0$
3.	$x = -1 - \sqrt{y^2 + 2y}$	3.	$2x = 3\sqrt{2} + \sqrt{17 - 2y + y^2}$
4.	$9x^2 - 4y^2 - 54x + 8y + 77 = 0$	4.	$2x^2 + 5y^2 - 8x + 10y + 33 = 0$
№зад.	Вариант 19.	№зад.	Вариант 20.
1.	$2x^2 - 3y^2 - 12x + 18y + 15 = 0$	1.	$3x^2 + y^2 - 24x + 6y + 9 = 0$
2.	$2y^2 - x - 44y + 250 = 0$	2.	$7x^2 - 14x + 2y + 11 = 0$
3.	$y = 1 + \sqrt{2x^2 - 12x + 2}$	3.	$3x = 12 - \sqrt{10y^2 - 60y}$
4.	$4x^2 - y^2 + 24x + 10y + 11 = 0$	4.	$16x^2 + 4y^2 - 16x - 12y + 77 = 0$
№зад.	Вариант 21.	№зад.	Вариант 22.
1.	$25x^2 + 100y^2 + 10x - 120y + 36 = 0$	1.	$4x^2 + 9y^2 - 8x + 36y + 4 = 0$
2.	$2y^2 - 7x + 16y + 25 = 0$	2.	$4x^2 - 25y^2 + 4x + 50y + 76 = 0$
3.	$10y = 3\sqrt{10} - 3\sqrt{x^2 + 8x + 26}$	3.	$\sqrt{17}x = 417 + 4\sqrt{y-1}$
4.	$4x^2 - y^2 - 4x + 2y = 0$	4.	$9x^2 + 9y^2 - 54x + 54y + 162 = 0$
№зад.	Вариант 23.	№зад.	Вариант 24.
1.	$16x^2 - 25y^2 - 32x - 150y + 191 = 0$	1.	$x^2 - 5y^2 - 14x - 30y - 41 = 0$
2.	$100x^2 - 36y^2 + 300x - 180y - 225 = 0$	2.	$4x^2 - 9y^2 - 8x - 72y + 4 = 0$
3.	$2y = 1 - 4\sqrt{x-1}$	3.	$\sqrt{6}x = 2\sqrt{6} + \sqrt{35-y}$
4.	$x^2 + 2y^2 + 4x + 12y + 30 = 0$	4.	$x^2 - 4y^2 - 4x + 56y - 192 = 0$
№зад.	Вариант 25.	№зад.	Вариант 26.
1.	$4x^2 + 9y^2 + 16x - 126y + 456 = 0$	1.	$4x^2 + y^2 + 48x + 2y + 109 = 0$
2.	$8x^2 - 9y^2 + 32x + 90y - 121 = 0$	2.	$2x^2 - y^2 - 12x + 4y - 2 = 0$
3.	$2x = 5 - \sqrt{3x+4}$	3.	$y = 2 + \sqrt{7-49x}$

4.	$4x^2 - y^2 - 32x + 6y + 55 = 0$	4.	$x^2 + 4y^2 - 10x - 16y + 81 = 0$
№зад.	Вариант 27.	№зад.	Вариант 28.
1.	$9x^2 - 4y^2 - 90x - 40y - 235 = 0$	1.	$x^2 - 36y^2 - 12x - 72y - 36 = 0$
2.	$4x^2 - y^2 + 24x - 10y + 47 = 0$	2.	$36x^2 - 25y^2 - 144x + 150y + 819 = 0$
3.	$x = 4 + \sqrt{8y + 8}$	3.	$\sqrt{17}y = 7\sqrt{17} - \sqrt{1-x}$
4.	$x^2 - 6y^2 - 24x + 120y - 456 = 0$	4.	$3x^2 + 4y^2 + 30x + 24y + 135 = 0$
№зад.	Вариант 29.	№зад.	Вариант 30.
1.	$3x^2 + 6x + 4y^2 - 8y - 5 = 0$	1.	$25x^2 - 4y^2 - 50x + 16y - 91 = 0$
2.	$4x^2 - 36y^2 + 4x + 36y - 17 = 0$	2.	$9x^2 - 25y^2 + 50y + 200 = 0$
3.	$7x = 36 - \sqrt{4+y}$	3.	$y = 2 + 2\sqrt{x-1}$
4.	$2x^2 - y^2 - 40x + 18y + 119 = 0$	4.	$2x^2 + 2y^2 - 20x + 8y + 66 = 0$

Поверхности второго порядка.

К задаче 5.

Вар.	Уравнения кривой	Ось вращения	Вар.	Уравнения кривой	Ось вращения
1	$\begin{cases} 16y^2 - 4z^2 = 64 \\ x = 0 \end{cases}$	Oz	16	$\begin{cases} 4y^2 = x \\ z = 0 \end{cases}$	Ox
2	$\begin{cases} 25x^2 - 4y^2 = 0 \\ z = 0 \end{cases}$	Oy	17	$\begin{cases} 16y^2 + 4z^2 = 64 \\ x = 0 \end{cases}$	Oz
3	$\begin{cases} x^2 - 9y^2 = 9 \\ z = 0 \end{cases}$	Ox	18	$\begin{cases} z = y^2 \\ x = 0 \end{cases}$	Oz
4	$\begin{cases} 4z^2 + x = 0 \\ y = 0 \end{cases}$	Ox	19	$\begin{cases} 9y^2 - z^2 = 0 \\ x = 0 \end{cases}$	Oz
5	$\begin{cases} 4x^2 - 25y^2 + 100 = 0 \\ z = 0 \end{cases}$	Ox	20	$\begin{cases} x^2 + z = 0 \\ y = 0 \end{cases}$	Oz
6	$\begin{cases} z^2 = 2y \\ x = 0 \end{cases}$	Ox	21	$\begin{cases} 4y^2 - z^2 = 16 \\ x = 0 \end{cases}$	Oz

7	$\begin{cases} 4x^2 - z^2 + 4 = 0 \\ y = 0 \end{cases}$	Oz	22	$\begin{cases} 9x^2 - 25y^2 = 0 \\ z = 0 \end{cases}$	Ox
8	$\begin{cases} 9y^2 + 25z^2 = 225 \\ x = 0 \end{cases}$	Oy	23	$\begin{cases} 4y^2 + z^2 = 4 \\ x = 0 \end{cases}$	Oz
9	$\begin{cases} x^2 - 16y^2 = 16 \\ z = 0 \end{cases}$	Ox	24	$\begin{cases} 4x^2 - y^2 = 0 \\ z = 0 \end{cases}$	Oy
10	$\begin{cases} x^2 - 4y^2 = 4 \\ z = 0 \end{cases}$	Ox	25	$\begin{cases} x^2 = 4y \\ z = 0 \end{cases}$	Oy
11	$\begin{cases} 9x^2 - 4z^2 = 36 \\ y = 0 \end{cases}$	Oz	26	$\begin{cases} 9x^2 + y^2 = 9 \\ z = 0 \end{cases}$	Oy
12	$\begin{cases} y^2 - 9z^2 = 9 \\ x = 0 \end{cases}$	Oy	27	$\begin{cases} 9y^2 - z^2 = 0 \\ x = 0 \end{cases}$	Oz
13	$\begin{cases} 4x^2 - 25y^2 = 0 \\ z = 0 \end{cases}$	Ox	28	$\begin{cases} x^2 - 9z^2 = 9 \\ y = 0 \end{cases}$	Ox
14	$\begin{cases} 16z^2 - 9y^2 = 144 \\ x = 0 \end{cases}$	Oy	29	$\begin{cases} x^2 + 16y^2 = 16 \\ z = 0 \end{cases}$	Ox
15	$\begin{cases} 9y^2 - 4z^2 = 0 \\ x = 0 \end{cases}$	Oz	30	$\begin{cases} 4y^2 - z^2 = 4 \\ x = 0 \end{cases}$	Oz

К задаче 6.

Вар	1	2	3
1	$9x^2 - y^2 + 4z^2 - 1 = 0$	$x = \frac{4}{3}\sqrt{9y^2 + z^2}$	$xy - 2x - y + 3 = 0$
2	$x^2 - 9y^2 - 9z = 0$	$y = \sqrt{z^2 - 4x^2 + 4}$	$9x^2 - 4y^2 + 9z^2 + 16y - 54z + 101 = 0$
3	$36x^2 - 4y^2 + 9z^2 - 36 = 0$	$z = 2 + \sqrt{4 - x^2 - y^2}$	$36x^2 + 9y^2 - 4z^2 - 36y + 36 = 0$
4	$4x^2 - 36y^2 - 9z^2 - 36 = 0$	$y + 2\sqrt{x^2 + z^2} = 0$	$36x^2 + y^2 + 4z^2 + 6y - 8z + 9 = 0$
5	$x^2 - 9y^2 - 4z = 0$	$z + \sqrt{x^2 + y^2} = 0$	$16x^2 + 4y^2 + z^2 - 24y - 4z + 24 = 0$
6	$4x^2 - 9y^2 - 36z^2 - 36 = 0$	$z = \sqrt{4x^2 + y^2 - 4}$	$9x^2 + 4y^2 + z^2 - 8y + 3 = 0$
7	$4x^2 - y^2 + 4z = 0$	$x = 3\sqrt{y^2 + 9}$	$36x^2 + 4y^2 + z^2 + 32y + 28 = 0$
8	$9x^2 - 4y^2 - z^2 = 0$	$z = \sqrt{4x^2 + y^2 + 1}$	$36x^2 + 9y^2 - 4z^2 - 54y + 45 = 0$
9	$4x^2 - y^2 + z^2 - 4 = 0$	$z = \sqrt{x^2 + y^2}$	$x^2 + z^2 - y - 4z + 7 = 0$
10	$36x^2 + 9y^2 - 4z^2 - 36 = 0$	$y = -1 - \sqrt{1 - x^2 - z^2}$	$x^2 - y^2 + 4z^2 - 2y - 8z + 3 = 0$
11	$25x^2 + y^2 + 4z^2 - 1 = 0$	$y = \sqrt{z - x^2}$	$2x^2 + y^2 - z^2 - 6y + 2z + 8 = 0$
12	$9x^2 + 4y^2 - 4z^2 - 36 = 0$	$y = \sqrt{z^2 - x^2}$	$4y^2 + z^2 + 16y - 2z - x + 17 = 0$

13	$9x^2 - y^2 + 4z = 0$	$z = \sqrt{4x^2 + 4y^2 - 1}$	$4y^2 + z^2 + 4x - 24y + 36 = 0$
14	$4x^2 - z^2 + 4y = 0$	$z = 3\sqrt{x^2 + \frac{1}{4}y^2 + 1}$	$9y^2 + 4z^2 - x - 8z + 4 = 0$
15	$144x^2 + 9y^2 + 4z^2 - 144 = 0$	$z = \sqrt{4 - 4x^2 + y^2}$	$16x^2 + 4y^2 - z^2 + 16y - 8z + 16 = 0$
16	$25x^2 + 25y^2 + 16z^2 - 100 = 0$	$z = 2\sqrt{\frac{1}{3}y^2 - x^2 - 1}$	$225x^2 + 36y^2 + 100z^2 - 600z = 0$
17	$x^2 - 4y^2 - 4z = 0$	$y = 3\sqrt{1 - x^2}$	$36x^2 - 4y^2 + 9z^2 - 36z = 0$
18	$4x^2 + 100y^2 + 25z^2 - 400 = 0$	$2z = \sqrt{y^2 - x^2}$	$x^2 + 2y^2 - z^2 + 2x - 4y + 2z + 1 = 0$
19	$4x^2 - y^2 + 9z^2 - 1 = 0$	$z = 3 - \sqrt{9 - x^2 - y^2}$	$16x^2 + 4y^2 - z^2 - 16y + 8z + 16 = 0$
20	$4x^2 + y^2 - z^2 + 4 = 0$	$2x = \sqrt{4 + y^2 - z^2}$	$x^2 + z + 1 = 0$
21	$x^2 - 25y^2 - 4z^2 = 0$	$y = 3 + \sqrt{9 - x^2 - z^2}$	$x^2 - y^2 + z^2 - 4y + 2z + 5 = 0$
22	$36x^2 - 4y^2 + 9z^2 - 144 = 0$	$y = \frac{1}{3}\sqrt{4z^2 - 16x^2 - 1}$	$16x^2 + 4y^2 + z^2 + 12z + 20 = 0$
23	$x^2 - 6y^2 = 9z$	$y = \frac{1}{5}\sqrt{9z^2 - 225x^2 + 225}$	$16x^2 - 4y^2 + z^2 - 64x + 60 = 0$
24	$9x^2 - z^2 + 4y = 0$	$z = \frac{1}{2}\sqrt{2y - 9x^2 - y^2}$	$16x^2 - 4y^2 + z^2 - 2z - 3 = 0$
25	$x^2 - 4y^2 - 4z = 0$	$y = -\sqrt{z^2 - 9x^2 + 9}$	$4x^2 - 9y^2 + 4z^2 + 16x + 54y - 101 = 0$
26	$25x^2 - 4y^2 + 16z = 0$	$z + \sqrt{9x^2 + 9y^2 - 1} = 0$	$36x^2 - 4y^2 + 9z^2 + 36z = 0$
27	$9x^2 + 4y^2 - z^2 - 1 = 0$	$2z = \sqrt{x^2 - 4y^2 - 4}$	$16x^2 - y^2 + 4z - 8 = 0$
28	$x^2 - 16y^2 - 4z = 0$	$y - \sqrt{9 - 36x^2 - 9z^2} = 0$	$16x^2 + 4y^2 - z^2 - 24y - 8z + 4 = 0$
29	$16x^2 - y^2 + 4z = 0$	$2y = -\sqrt{16 - 16x^2 + z^2}$	$16x^2 + 4y^2 - z^2 - 16y - 8z = 0$
30	$9x^2 - 25y^2 - 225 = 0$	$2z + \sqrt{16 - 16x^2 + y^2} = 0$	$x^2 + y^2 - 4x - 6y - z + 13 = 0$