

**Задача 6.** Найми площадь фигуры, ограниченной данными линиями.

6.1.  $y = 3/x, y = 4e^x, y = 3, y = 4.$  6.2.  $x = \sqrt{36 - y^2}, x = 6 - \sqrt{36 - y^2}.$

6.3.  $x^2 + y^2 = 72, 6y = -x^2 (y \leq 0).$  6.4.  $x = 8 - y^2, x = -2y.$

6.5.  $y = 3/x, y = 8e^x, y = 3, y = 8.$  6.6.  $y = \sqrt{x}/2, y = 1/2x, x = 16.$

6.7.  $x = 5 - y^2, x = -4y.$  6.8.  $x^2 + y^2 = 12, -\sqrt{6y} = x^3 (y \leq 0).$

6.9.  $y = \sqrt{12 - x^2}, y = 2\sqrt{3} - \sqrt{12 - x^2}, x = 0 (x \geq 0).$

6.10.  $y = 3\sqrt{x}/2, y = 3/2x, x = 9.$

6.11.  $y = \sqrt{24 - x^2}, 2\sqrt{3}y = x^2, x = 0 (x \geq 0).$

6.12.  $y = \sin x, y = \cos x, x = 0 (x \geq 0).$

6.13.  $x = 20 - x^2, x = -8x.$

6.14.  $y = \sqrt{18 - x^2}, y = 3\sqrt{2} - \sqrt{18 - x^2}.$  6.15.  $x = 32 - x^2, x = -4x.$

6.16.  $y = 2/x, y = 5e^x, y = 2, y = 5.$

6.17.  $x^2 + y^2 = 36, 3\sqrt{2}y = x^2 (y \geq 0).$

6.18.  $y = 3\sqrt{x}, y = 3/x, x = 4.$

6.19.  $y = 6 - \sqrt{36 - x^2}, y = \sqrt{36 - x^2}, x = 0 (x \geq 0).$

6.20.  $y = 25/4 - x^2, y = x - 5/2.$  6.21.  $y = \sqrt{x}, y = 1/x, x = 16.$

6.22.  $y = 2/x, y = 7e^x, y = 2, y = 7.$  6.23.  $x = 27 - y^2, x = -6y.$

6.24.  $x = \sqrt{72 - y^2}, 6x = y^2, y = 0 (y \geq 0).$

6.25.  $y = \sqrt{6 - x^2}, y = \sqrt{6} - \sqrt{6 - x^2}.$  6.26.  $y = \frac{3}{2}\sqrt{x}, y = \frac{3}{2x}, x = 4.$

6.27.  $y = \sin x, y = \cos x, x = 0 (x \leq 0).$

6.28.  $y = 1/x, y = 6e^x, y = 1, y = 6.$  6.29.  $y = 3\sqrt{x}, y = 3/x, x = 9.$

6.30.  $y = 11 - x^2, y = -10x.$  6.31.  $x^2 + y^2 = 12, x\sqrt{6} = y^2 (x \geq 0).$

**Задача 9.** Пластинка  $D$  задана неравенствами,  $\mu$  — поверхностная плотность. Найти массу пластины.

- 9.1.  $D: x^2 + y^2 / 4 \leq 1;$   
 $\mu = y^2.$
- 9.3.  $D: x^2 / 9 + y^2 / 25 \leq 1, y \geq 0;$   
 $\mu = x^2 y.$
- 9.5.  $D: 1 \leq x^2 / 4 + y^2 \leq 4;$   
 $y \geq 0, y \leq x / 2; \mu = 8y / x^3.$
- 9.7.  $D: x^2 / 4 + y^2 \leq 1;$   
 $\mu = 4y^4.$
- 9.9.  $D: 1 \leq x^2 / 16 + y^2 / 4 \leq 4;$   
 $x \geq 0, y \geq x / 2; \mu = x / y.$
- 9.11.  $D: x^2 / 4 + y^2 \leq 1;$   
 $x \geq 0, y \geq 0; \mu = 6x^3 y^3.$
- 9.13.  $D: x^2 / 9 + y^2 / 4 \leq 1;$   
 $\mu = x^2 y^2.$
- 9.15.  $D: x^2 / 4 + y^2 \leq 1;$   
 $y \geq 0, x \geq 0; \mu = 30x^3 y^7.$
- 9.17.  $D: x^2 + y^2 / 25 \leq 1, y \geq 0;$   
 $\mu = 7x^4 y.$
- 9.19.  $D: x^2 / 4 + y^2 / 9 \leq 1;$   
 $\mu = x^2.$
- 9.21.  $D: x^2 / 9 + y^2 \leq 1, x \geq 0;$   
 $\mu = 11xy^8.$
- 9.23.  $D: 1 \leq x^2 / 9 + y^2 / 4 \leq 5;$   
 $x \geq 0, y \leq 2x / 3; \mu = x / y.$
- 9.25.  $D: x^2 / 4 + y^2 / 25 \leq 1;$   
 $\mu = x^4.$
- 9.27.  $D: 1 \leq x^2 / 4 + y^2 / 9 \leq 36;$   
 $x \geq 0, y \geq 3x / 2; \mu = 9x / y^3.$
- 9.29.  $D: x^2 / 16 + y^2 \leq 1;$   
 $y \geq 0, x \geq 0; \mu = 105x^3 y^9.$
- 9.31.  $D: 1 \leq x^2 / 16 + y^2 \leq 3;$   
 $x \geq 0, y \geq x / 4; \mu = x / y^5.$
- 9.2.  $D: 1 \leq x^2 / 9 + y^2 / 4 \leq 2;$   
 $y \geq 0, y \leq 2x / 3; \mu = y / x.$
- 9.4.  $D: x^2 / 9 + y^2 / 25 \leq 1, y \geq 0;$   
 $\mu = 7x^2 y / 18.$
- 9.6.  $D: x^2 / 9 + y^2 \leq 1, x \geq 0;$   
 $\mu = 7xy^6.$
- 9.8.  $D: 1 \leq x^2 / 4 + y^2 / 9 \leq 4;$   
 $x \geq 0, y \leq 3x / 2; \mu = x / y.$
- 9.10.  $D: x^2 / 4 + y^2 / 9 \leq 1;$   
 $y \geq 0, x \geq 0; \mu = x^3 y.$
- 9.12.  $D: 1 \leq x^2 / 4 + y^2 \leq 25;$   
 $x \geq 0, y \geq x / 2; \mu = x / y^3.$
- 9.14.  $D: x^2 / 16 + y^2 \leq 1;$   
 $x \geq 0, y \geq 0; \mu = 5xy^7.$
- 9.16.  $D: 1 \leq x^2 / 9 + y^2 / 4 \leq 3;$   
 $y \geq 0, y \leq 2x / 3; \mu = y / x.$
- 9.18.  $D: x^2 + y^2 / 9 \leq 1, y \geq 0;$   
 $\mu = 35x^4 y^3.$
- 9.20.  $D: 1 \leq x^2 + y^2 / 16 \leq 9;$   
 $y \geq 0, y \leq 4x; \mu = y / x^3.$
- 9.22.  $D: 1 \leq x^2 / 4 + y^2 / 16 \leq 5;$   
 $y \geq 0, y \geq 2x; \mu = x / y.$
- 9.24.  $D: x^2 / 4 + y^2 / 9 \leq 1;$   
 $y \geq 0, x \geq 0; \mu = x^5 y.$
- 9.26.  $D: x^2 + y^2 / 4 \leq 1;$   
 $y \geq 0, x \geq 0; \mu = 15x^5 y^3.$
- 9.28.  $D: x^2 / 100 + y^2 \leq 1;$   
 $y \geq 0, x \geq 0; \mu = 6xy^9.$
- 9.30.  $D: 1 \leq x^2 / 9 + y^2 / 16 \leq 2;$   
 $y \geq 0, y \leq 4x / 3; \mu = 27y / x^5.$

**Задача 11.** Найти объем тела, заданного ограничивающими его поверхностями.

- 11.1.  $x^2 + y^2 = 2y$ ,  
 $z = 5/4 - x^2$ ,  $z = 0$ .
- 11.2.  $x^2 + y^2 = y$ ,  $x^2 + y^2 = 4y$ ,  
 $z = \sqrt{x^2 + y^2}$ ,  $z = 0$ .
- 11.3.  $x^2 + y^2 = 8\sqrt{2}x$ ,  
 $z = x^2 + y^2 - 64$ ,  $z = 0$  ( $z \geq 0$ ).
- 11.4.  $x^2 + y^2 + 4x = 0$ ,  
 $z = 8 - y^2$ ,  $z = 0$ .
- 11.5.  $x^2 + y^2 = 6x$ ,  $x^2 + y^2 = 9x$   
 $z = \sqrt{x^2 + y^2}$ ,  $z = 0$ ,  $y = 0$  ( $y \leq 0$ ).
- 11.6.  $x^2 + y^2 = 6\sqrt{2}y$ ,  
 $z = x^2 + y^2 - 36$ ,  $z = 0$  ( $z \geq 0$ ).
- 11.7.  $x^2 + y^2 = 2y$ ,  
 $z = 9/4 - x^2$ ,  $z = 0$ .
- 11.8.  $x^2 + y^2 = 2y$ ,  $x^2 + y^2 = 5y$ ,  
 $z = \sqrt{x^2 + y^2}$ ,  $z = 0$ .
- 11.9.  $x^2 + y^2 + 2\sqrt{2}y = 0$ ,  
 $z = x^2 + y^2 - 4$ ,  $z = 0$  ( $z \geq 0$ ).
- 11.10.  $x^2 + y^2 = 4x$ ,  
 $z = 10 - y^2$ ,  $z = 0$ .
- 11.11.  $x^2 + y^2 = 7x$ ,  $x^2 + y^2 = 10x$ ,  
 $z = \sqrt{x^2 + y^2}$ ,  $z = 0$ ,  $y = 0$  ( $y \leq 0$ ).
- 11.12.  $x^2 + y^2 = 8\sqrt{2}y$ ,  
 $z = x^2 + y^2 - 64$ ,  $z = 0$  ( $z \geq 0$ ).
- 11.13.  $x^2 + y^2 = 2y$ ,  
 $z = 13/4 - x^2$ ,  $z = 0$ .
- 11.14.  $x^2 + y^2 = 3y$ ,  $x^2 + y^2 = 6y$ ,  
 $z = \sqrt{x^2 + y^2}$ ,  $z = 0$ .
- 11.15.  $x^2 + y^2 = 6\sqrt{2}x$ ,  
 $z = x^2 + y^2 - 36$ ,  $z = 0$  ( $z \geq 0$ ).
- 11.16.  $x^2 + y^2 = 2\sqrt{2}y$ ,  
 $z = x^2 + y^2 - 4$ ,  $z = 0$  ( $z \geq 0$ ).
- 11.17.  $x^2 + y^2 = 4x$ ,  
 $z = 12 - y^2$ ,  $z = 0$ .
- 11.18.  $x^2 + y^2 = 8x$ ,  $x^2 + y^2 = 11x$ ,  
 $z = \sqrt{x^2 + y^2}$ ,  $z = 0$ ,  $y = 0$  ( $y \leq 0$ ).
- 11.19.  $x^2 + y^2 = 4\sqrt{2}x$ ,  
 $z = x^2 + y^2 - 16$ ,  $z = 0$  ( $z \geq 0$ ).
- 11.20.  $x^2 + y^2 = 4y$ ,  
 $z = 4 - x^2$ ,  $z = 0$ .
- 11.21.  $x^2 + y^2 = 4y$ ,  $x^2 + y^2 = 7y$ ,  
 $z = \sqrt{x^2 + y^2}$ ,  $z = 0$ .
- 11.22.  $x^2 + y^2 = 4\sqrt{2}y$ ,  
 $z = x^2 + y^2 - 16$ ,  $z = 0$  ( $z \geq 0$ ).
- 11.23.  $x^2 + y^2 + 4x = 0$ ,  
 $z = 17/4 - y^2$ ,  $z = 0$ .
- 11.24.  $x^2 + y^2 = 9x$ ,  $x^2 + y^2 = 12x$ ,  
 $z = \sqrt{x^2 + y^2}$ ,  $z = 0$ ,  $y = 0$  ( $y \geq 0$ ).
- 11.25.  $x^2 + y^2 + 2\sqrt{2}x = 0$ ,  
 $z = x^2 + y^2 - 4$ ,  $z = 0$  ( $z \geq 0$ ).
- 11.26.  $x^2 + y^2 = 4y$ ,  
 $z = 6 - x^2$ ,  $z = 0$ .
- 11.27.  $x^2 + y^2 = 10x$ ,  $x^2 + y^2 = 13x$ ,  
 $z = \sqrt{x^2 + y^2}$ ,  $z = 0$ ,  $y = 0$  ( $y \geq 0$ ).
- 11.28.  $x^2 + y^2 = 2\sqrt{2}x$ ,  
 $z = x^2 + y^2 - 4$ ,  $z = 0$  ( $z \geq 0$ ).
- 11.29.  $x^2 + y^2 = 2x$ ,  
 $z = 21/4 - y^2$ ,  $z = 0$ .
- 11.30.  $x^2 + y^2 = 5y$ ,  $x^2 + y^2 = 8y$ ,  
 $z = \sqrt{x^2 + y^2}$ ,  $z = 0$ .
- 11.31.  $x^2 + y^2 + 2x = 0$ ,  
 $z = 25/4 - y^2$ ,  $z = 0$ .

**Задача 13.** Найти объем тела, заданного ограничивающими его поверхностями.

$$13.1. \quad z = \sqrt{9 - x^2 - y^2}, \\ 9z/2 = x^2 + y^2.$$

$$13.3. \quad z = \sqrt{4 - x^2 - y^2}, \\ z = \sqrt{(x^2 + y^2)/255}.$$

$$13.5. \quad z = \sqrt{\frac{16}{9} - x^2 - y^2}, \\ 2z = x^2 + y^2.$$

$$13.7. \quad z = \sqrt{25 - x^2 - y^2}, \\ z = \sqrt{(x^2 + y^2)/99}.$$

$$13.9. \quad z = 21\sqrt{x^2 + y^2}/2, \\ z = 23/2 - x^2 - y^2.$$

$$13.11. \quad z = \sqrt{9 - x^2 - y^2}, \\ z = \sqrt{(x^2 + y^2)/80}.$$

$$13.13. \quad z = \sqrt{1 - x^2 - y^2}, \\ 3z/2 = x^2 + y^2.$$

$$13.15. \quad z = \sqrt{36 - x^2 - y^2}, \\ z = \sqrt{(x^2 + y^2)/63}.$$

$$13.17. \quad z = \sqrt{144 - x^2 - y^2}, \\ 18z = x^2 + y^2.$$

$$13.19. \quad z = \sqrt{9 - x^2 - y^2}, \\ z = \sqrt{(x^2 + y^2)/35}.$$

$$13.21. \quad z = \sqrt{36 - x^2 - y^2}, \\ 9z = x^2 + y^2.$$

$$13.23. \quad z = \sqrt{16 - x^2 - y^2}, \\ z = \sqrt{(x^2 + y^2)/15}.$$

$$13.25. \quad z = \sqrt{4/9 - x^2 - y^2}, \\ z = x^2 + y^2.$$

$$13.27. \quad z = \sqrt{9 - x^2 - y^2}, \\ z = \sqrt{(x^2 + y^2)/8}.$$

$$13.29. \quad z = \sqrt{64 - x^2 - y^2}, \\ 12z = x^2 + y^2.$$

$$13.31. \quad z = \sqrt{36 - x^2 - y^2}, \quad z = \sqrt{(x^2 + y^2)/3}.$$

$$13.2. \quad z = 15\sqrt{x^2 + y^2}/2, \\ z = 17/2 - x^2 - y^2.$$

$$13.4. \quad z = \sqrt{64 - x^2 - y^2}, \quad z = 1, \\ x^2 + y^2 = 60 \quad (\text{внутри цилиндра}).$$

$$13.6. \quad z = 3\sqrt{x^2 + y^2}, \\ z = 10 - x^2 - y^2.$$

$$13.8. \quad z = \sqrt{100 - x^2 - y^2}, \quad z = 6, \\ x^2 + y^2 = 51 \quad (\text{внутри цилиндра}).$$

$$13.10. \quad z = \sqrt{16 - x^2 - y^2}, \\ 6z = x^2 + y^2.$$

$$13.12. \quad z = \sqrt{81 - x^2 - y^2}, \quad z = 5, \\ x^2 + y^2 = 45 \quad (\text{внутри цилиндра}).$$

$$13.14. \quad z = 6\sqrt{x^2 + y^2}, \\ z = 16 - x^2 - y^2.$$

$$13.16. \quad z = \sqrt{64 - x^2 - y^2}, \quad z = 1, \\ x^2 + y^2 = 39 \quad (\text{внутри цилиндра}).$$

$$13.18. \quad z = 3\sqrt{x^2 + y^2}/2, \\ z = 5/2 - x^2 - y^2.$$

$$13.20. \quad z = \sqrt{49 - x^2 - y^2}, \quad z = 3, \\ x^2 + y^2 = 33 \quad (\text{внутри цилиндра}).$$

$$13.22. \quad z = 9\sqrt{x^2 + y^2}, \\ z = 22 - x^2 - y^2.$$

$$13.24. \quad z = \sqrt{36 - x^2 - y^2}, \quad z = 2, \\ x^2 + y^2 = 45 \quad (\text{внутри цилиндра}).$$

$$13.26. \quad z = 12\sqrt{x^2 + y^2}, \\ z = 28 - x^2 - y^2.$$

$$13.28. \quad z = \sqrt{25 - x^2 - y^2}, \quad z = 1, \\ x^2 + y^2 = 21 \quad (\text{внутри цилиндра}).$$

$$13.30. \quad z = 9\sqrt{x^2 + y^2}/2, \\ z = 11/2 - x^2 - y^2.$$

**Задача 14.** Найти объем тела, заданного ограничивающими его поверхностями.

14.1.  $z = 2 - 12(x^2 + y^2)$ ,  
 $z = 24x + 2$ .

14.3.  $z = 8(x^2 + y^2) + 3$ ,  
 $z = 16x + 3$ .

14.5.  $z = 4 - 14(x^2 + y^2)$ ,  
 $z = 4 - 28x$ .

14.7.  $z = 32(x^2 + y^2) + 3$ ,  
 $z = 3 - 64x$ .

14.9.  $z = 2 - 4(x^2 + y^2)$ ,  
 $z = 8x + 2$ .

14.11.  $z = 24(x^2 + y^2) + 1$ ,  
 $z = 48x + 1$ .

14.13.  $z = -16(x^2 + y^2) - 1$ ,  
 $z = -32x - 1$ .

14.15.  $z = 26(x^2 + y^2) - 12$ ,  
 $z = -52x - 2$ .

14.17.  $z = -2(x^2 + y^2) - 1$ ,  
 $z = 4y - 1$ .

14.19.  $z = 30(x^2 + y^2) + 1$ ,  
 $z = 60y + 1$ .

14.21.  $z = 2 - 18(x^2 + y^2)$ ,  
 $z = 2 - 36y$ .

14.23.  $z = 22(x^2 + y^2) + 3$ ,  
 $z = 3 - 44y$ .

14.25.  $z = 4 - 6(x^2 + y^2)$ ,  
 $z = 12y + 4$ .

14.27.  $z = 28(x^2 + y^2) + 3$ ,  
 $z = 56y + 3$ .

14.29.  $z = 2 - 18(x^2 + y^2)$ ,  
 $z = 2 - 36y$ .

14.31.  $z = 10(x^2 + y^2) + 1$ ,  
 $z = 1 - 20y$ .

14.2.  $z = 10[(x - 1)^2 + y^2] + 1$ ,  
 $z = 21 - 20x$ .

14.4.  $z = 2 - 20[(x + 1)^2 + y^2]$ ,  
 $z = -40x - 38$ .

14.6.  $z = 28[(x + 1)^2 + y^2] + 3$ ,  
 $z = 56 + 59x$ .

14.8.  $z = 4 - 6[(x - 1)^2 + y^2]$ ,  
 $z = 12x - 8$ .

14.10.  $z = 22[(x - 1)^2 + y^2] + 3$ ,  
 $z = 47 - 44x$ .

14.12.  $z = 2 - 18[(x + 1)^2 + y^2]$ ,  
 $z = -36x - 34$ .

14.14.  $z = 30[(x + 1)^2 + y^2] + 1$ ,  
 $z = 60x + 61$ .

14.16.  $z = -2[(x - 1)^2 + y^2] - 1$ ,  
 $z = 4x - 5$ .

14.18.  $z = 26[(x - 1)^2 + y^2] - 2$ ,  
 $z = 50 - 52x$ .

14.20.  $z = -16[(x + 1)^2 + y^2] - 1$ ,  
 $z = -32x - 33$ .

14.22.  $z = 24[(x + 1)^2 + y^2] + 1$ ,  
 $z = 48x + 49$ .

14.24.  $z = 2 - 4[(x - 1)^2 + y^2]$ ,  
 $z = 8x - 6$ .

14.26.  $z = 32[(x - 1)^2 + y^2] + 3$ ,  
 $z = 67 - 64x$ .

14.28.  $z = 4 - 14[(x + 1)^2 + y^2]$ ,  
 $z = -28x - 24$ .

14.30.  $z = 8[(x + 1)^2 + y^2] + 3$ ,  
 $z = 16x + 19$ .

**Задача 16.** Тело  $V$  задано ограничивающими его поверхностями,  $\mu$  – плотность. Найти массу тела.

- 16.1.  $64(x^2 + y^2) = z^2$ ,  $x^2 + y^2 = 4$ ,  $y = 0$ ,  $z = 0$ ,  $(y \geq 0, z \geq 0)$ ,  $\mu = 5(x^2 + y^2)/4$ .
- 16.2.  $x^2 + y^2 + z^2 = 4$ ,  $x^2 + y^2 = 1$ ,  $(x^2 + y^2 \leq 1)$ ,  $x = 0$  ( $x \geq 0$ ),  $\mu = 4|z|$ .
- 16.3.  $x^2 + y^2 = 1$ ,  $x^2 + y^2 = 2z$ ,  $x = 0$ ,  $y = 0$ ,  $z = 0$ ,  $(x \geq 0, y \geq 0)$ ,  $\mu = 80yz$ .
- 16.4.  $x^2 + y^2 = \frac{16}{49}z^2$ ,  $x^2 + y^2 = \frac{4}{7}z$ ,  $x = 0$ ,  $y = 0$ ,  $(x \geq 0, y \geq 0)$ ,  $\mu = 10x$ .
- 16.5.  $x^2 + y^2 + z^2 = 1$ ,  $x^2 + y^2 = 4z^2$ ,  $x = 0$ ,  $y = 0$ ,  $(x \geq 0, y \geq 0, z \geq 0)$ ,  $\mu = 20z$ .
- 16.6.  $36(x^2 + y^2) = z^2$ ,  $x^2 + y^2 = 1$ ,  $x = 0$ ,  $y = 0$ ,  $(x \geq 0, z \geq 0)$ ,  $\mu = 5(x^2 + y^2)/6$ .
- 16.7.  $x^2 + y^2 + z^2 = 16$ ,  $x^2 + y^2 = 4$ ,  $(x^2 + y^2 \leq 4)$ ,  $\mu = 2|z|$ .
- 16.8.  $x^2 + y^2 = 4$ ,  $x^2 + y^2 = 8z$ ,  $x = 0$ ,  $y = 0$ ,  $z = 0$ ,  $(x \geq 0, y \geq 0)$ ,  $\mu = 5x$ .
- 16.9.  $x^2 + y^2 = \frac{4}{25}z^2$ ,  $x^2 + y^2 = \frac{2}{5}z$ ,  $x = 0$ ,  $y = 0$ ,  $(x \geq 0, y \geq 0)$ ,  $\mu = 28xz$ .
- 16.10.  $x^2 + y^2 + z^2 = 4$ ,  $x^2 + y^2 = z^2$ ,  $x = 0$ ,  $y = 0$ ,  $(x \geq 0, y \geq 0, z \geq 0)$ ,  $\mu = 6z$ .
- 16.11.  $25(x^2 + y^2) = z^2$ ,  $x^2 + y^2 = 4$ ,  $x = 0$ ,  $y = 0$ ,  $z = 0$ ,  $(x \geq 0, y \geq 0, z \geq 0)$ ,  $\mu = 2(x^2 + y^2)$ .
- 16.12.  $x^2 + y^2 + z^2 = 9$ ,  $x^2 + y^2 = 4$ ,  $(x^2 + y^2 \leq 4)$ ,  $y = 0$  ( $y \geq 0$ ),  $\mu = |z|$ .
- 16.13.  $x^2 + y^2 = 1$ ,  $x^2 + y^2 = 6z$ ,  $x = 0$ ,  $y = 0$ ,  $z = 0$ ,  $(x \geq 0, y \geq 0)$ ,  $\mu = 90y$ .
- 16.14.  $x^2 + y^2 = z^2/25$ ,  $x^2 + y^2 = z/5$ ,  $x = 0$ ,  $y = 0$ ,  $(x \geq 0, y \geq 0)$ ,  $\mu = 14yz$ .
- 16.15.  $x^2 + y^2 + z^2 = 4$ ,  $x^2 + y^2 = 9z^2$ ,  $x = 0$ ,  $y = 0$ ,  $(x \geq 0, y \geq 0, z \geq 0)$ ,  $\mu = 10z$ .
- 16.16.  $9(x^2 + y^2) = z^2$ ,  $x^2 + y^2 = 4$ ,  $x = 0$ ,  $y = 0$ ,  $z = 0$ ,  $(x \geq 0, y \geq 0, z \geq 0)$ ,  $\mu = 5(x^2 + y^2)/3$ .
- 16.17.  $x^2 + y^2 + z^2 = 4$ ,  $x^2 + y^2 = 1$ ,  $(x^2 + y^2 \leq 1)$ ,  $\mu = 6|z|$ .
- 16.18.  $x^2 + y^2 = 1$ ,  $x^2 + y^2 = z$ ,  $x = 0$ ,  $y = 0$ ,  $z = 0$ ,  $(x \geq 0, y \geq 0)$ ,  $\mu = 10y$ .
- 16.19.  $x^2 + y^2 = z^2/49$ ,  $x^2 + y^2 = z/7$ ,  $x = 0$ ,  $y = 0$ ,  $(x \geq 0, y \geq 0)$ ,  $\mu = 10xz$ .
- 16.20.  $x^2 + y^2 + z^2 = 4$ ,  $x^2 + y^2 = 4z^2$ ,  $x = 0$ ,  $y = 0$ ,  $(x \geq 0, y \geq 0, z \geq 0)$ ,  $\mu = 10z$ .
- 16.21.  $16(x^2 + y^2) = z^2$ ,  $x^2 + y^2 = 1$ ,  $x = 0$ ,  $y = 0$ ,  $z = 0$ ,  $(x \geq 0, y \geq 0, z \geq 0)$ ,  $\mu = 5(x^2 + y^2)$ .
- 16.22.  $x^2 + y^2 + z^2 = 16$ ,  $x^2 + y^2 = 4$ ,  $(x^2 + y^2 \leq 4)$ ,  $\mu = |z|$ .
- 16.23.  $x^2 + y^2 = 4$ ,  $x^2 + y^2 = 4z$ ,  $x = 0$ ,  $y = 0$ ,  $z = 0$ ,  $(x \geq 0, y \geq 0)$ ,  $\mu = 5y$ .
- 16.24.  $x^2 + y^2 = z^2$ ,  $x^2 + y^2 = z$ ,  $x = 0$ ,  $y = 0$ ,  $(x \geq 0, y \geq 0)$ ,  $\mu = 35yz$ .

- 85.1.  $\iint_D y \ln x dx dy$ ,  $D: xy=1$ ,  $y=\sqrt{x}$ ,  $x=2$ .
- 85.2.  $\iint_D (\cos 2x + \sin y) dx dy$ ,  $D: x=0$ ,  $y=0$ ,  $4x+4y=\pi$ .
- 85.3.  $\iint_D \sin(x+y) dx dy$ ,  $D: x=0$ ,  $y=\pi/2$ ,  $y=x$ .
- 85.4.  $\iint_D (3x+y) dx dy$ ,  $D: x^2+y^2 \leq 9$ ,  $y \geq x+3$ .
- 85.5.  $\iint_D x dx dy$ ,  $D$  – треугольник с вершинами,  $A(2;2)$ ,  $B(7;2)$ ,  $C(4;5)$ .
- 85.6.  $\iint_D x^2(x-y) dx dy$ ,  $D: x=y^2$ ,  $y=x^2$ .
- 85.7.  $\iint_D (2x+3y+1) dx dy$ ,  $D$  – треугольник с вершинами,  $A(2;3)$ ,  $B(-1;-1)$ ,  $C(2;-4)$ .
- 85.8.  $\iint_D e^x dx dy$ ,  $D: x=0$ ,  $y=1$ ,  $y=2$ ,  $x=\ln y$ .
- 85.9.  $\iint_D xy dx dy$ ,  $D$  – треугольник с вершинами  $O(0;0)$ ,  $A(0;1)$ ,  $B(1;0)$ .
- 85.10.  $\iint_D (x^2 - y) dx dy$ ,  $D: x=0$ ,  $y=0$ ,  $x+y=2$ .
- 85.11.  $\iint_D (xy + x^2 - 2y) dx dy$ ,  $D: y=0$ ,  $x=y$ ,  $x=1$ .
- 85.12.  $\iint_D 2x^2 y dx dy$ ,  $D: y=x^2+3$ ,  $y=4x$ ,  $x=0$ .
- 85.13.  $\iint_D (x+2y-1) dx dy$ ,  $D: y=x^3$ ,  $x+y=2$ ,  $x=0$ .
- 85.14.  $\iint_D (2x^2 y + xy + 2) dx dy$ ,  $D: y=1-x^2$ ,  $y=0$ .
- 85.15.  $\iint_D x^2 y dx dy$ ,  $D: y=0$ ,  $y=\sqrt{2x-x^2}$ .
- 85.16.  $\iint_D (x+xy+y) dx dy$ ,  $D: x=0$ ,  $y=0$ ,  $x+y=3$ .
- 85.17.  $\iint_D \sqrt{x-y} dx dy$ ,  $D$  – треугольник с вершинами  $O(0;0)$ ,  $A(1;-1)$ ,  $B(1;1)$ .
- 85.18.  $\iint_D \sqrt{xy-y^2} dx dy$ ,  $D$  – треугольник с вершинами  $O(0;0)$ ,  $A(10;1)$ ,  $B(1;1)$ .
- 85.19.  $\iint_D e^{x/y} dx dy$ ,  $D: y^2=x$ ,  $x=0$ ,  $y=1$ .
- 85.20.  $\iint_D e^{x+\sin y} \cos y dx dy$ ,  $D: x=0$ ,  $x=\pi$ ,  $y=0$ ,  $y=\frac{\pi}{2}$ .
- 85.21.  $\iint_D (x^2 + y^2) dx dy$ ,  $D: y=x$ ,  $x=0$ ,  $y=1$ ,  $y=2$ .
- 85.22.  $\iint_D (3x^2 - 2xy + y) dx dy$ ,  $D: x=0$ ,  $x=y^2$ ,  $y=2$ .
- 85.23.  $\iint_D y(x-1) dx dy$ ,  $D: y=2-x^2$ ,  $y=2x-1$ .
- 85.24.  $\iint_D \frac{dx dy}{(x+y)^2}$ ,  $D: x=3$ ,  $x=4$ ,  $y=1$ ,  $y=2$ .
- 85.25.  $\iint_D x \sqrt{y} dx dy$ ,  $D: y=1$ ,  $y=x$ ,  $y=3x$ .

88. Вычислить площади фигур, ограниченных заданными линиями:

88.1.  $x = y^2 - 2y, x + y = 0.$

88.2.  $y^2 = 4x - x^2, y^2 = 2x \quad (2x \leq y^2 \leq 4x - x^2)$

88.3.  $y = 2 - x, y^2 = 4x + 4.$

88.4.  $3y^2 = 25x, 5x^2 = 9y.$

88.5.  $y^2 + 2y - 3x + 1 = 0, 3x - 3y - 7 = 0.$

88.6.  $y = 4x - x^2, y = 2x^2 - 5x$

88.7.  $x = 4 - y^2, x + 2y - 4 = 0.$

88.8.  $y^2 = 10x + 25, y^2 = -6x + 9.$

88.9.  $x^2 + y^2 = 2x, x^2 + y^2 = 4x, y = x, y = 0.$

88.10.  $y = \frac{3}{x}, y = 4e^x, y = 3, y = 4.$

88.11.  $x^2 + y^2 = 72, 6y = -x^2 \quad (y \leq 0)$

88.12.  $x = \sqrt{36 - y^2}, x = 6 - \sqrt{36 - y^2}.$

88.13.  $x = 8 - y^2, x = -2y.$

88.14.  $y = \frac{\sqrt{x}}{2}, y = \frac{1}{2x}, x = 16.$

88.15.  $x^2 + y^2 = 12, x^2 = -\sqrt{6}y \quad (y \leq 0).$

88.16.  $xy = 4, x + y - 5 = 0.$

88.17.  $y = \sin x, y = \cos x, y = 0, \left(0 \leq x \leq \frac{\pi}{2}\right).$

88.18.  $y = e^x, y = e^{-x}, y = 2.$

88.19.  $y = \ln x, x = 2, y = 0.$

88.20.  $y = 2x - x^2, y = x^2.$

88.21.  $y = \frac{3}{x}, x^2 + y^2 = 10, (x > 0)$

88.22.  $y = \cos x, y = \cos 2x, y = 0 \quad \left(0 \leq x \leq \frac{\pi}{2}\right).$

88.23.  $y = 4(1 - x), x^2 + y^2 = 4 \quad (x \geq 0)$

88.24.  $y = \frac{9}{x}, y = x, x = 6.$

88.25.  $y^2 = -x, x = -4.$

88.26.  $y^2 = 2x, y = -x.$

88.27.  $y = \ln x, y = x - 1, y = -1.$

88.28.  $y = \sin x, y = \cos x, x = 0.$

88.29.  $x^2 + y^2 = 1, x^2 + y^2 = 25, y = x\sqrt{3} \quad (x \geq 0)$

88.30.  $y = \frac{1}{3}x^2, y = x + 3.$