1. Проверить, удовлетворяет ли указанному уравнению данная функция
2. Вычислить и оценить абсолютную и относительную погрешность вычисления
3. Исследовать функцию на экстремум
4. Найти наибольшее и наименьшее значение функции в заданной области

1	$x^2\dfrac{\partial^2 z}{\partial x^2}+2xy\dfrac{\partial^2 z}{\partial x\partial y}+y^2\dfrac{\partial^2 z}{\partial y^2}=0, z=\dfrac{y}{x}$	$z=\operatorname{arctg}\dfrac{x}{y}, x=1\pm 0,2, y=1\pm 0,03$	$z=x^2+xy+y^2-6x-9y$	$z=2x^2-y^2-x$, $D: x^2+y^2\le 1, x+y\le 1, x\ge 0$
2	$x\dfrac{\partial z}{\partial x}+y\dfrac{\partial z}{\partial y}=3\left(x^3-y^3\right), z=\ln\dfrac{y}{x}+x^3-y^3$	$z=\dfrac{\sqrt[3]{x+1}}{\sqrt{y}}, x=7\pm 0,1, y=9\pm 0,1$	$z=x^3+xy^2+6xy$	$z=2x^2-y^2+y$, $D: x^2+y^2\le 1, x+y\le 1, y\ge 0$
3	$\dfrac{\partial^2 z}{\partial x^2}+\dfrac{\partial^2 z}{\partial y^2}=0, z=\ln\left(x^2+\left(y+1\right)^2\right)$	$z=x^y, x=2\pm 0,1, y=3\pm 0,3$	$z=xy^2\left(1-x-y\right)$	$z=2x^2-y^2-5y$, $D: x^2+y^2\le 1, x-y\le 1, y\le 0$
4	$y\dfrac{\partial^2 z}{\partial x\partial y}=\left(1+y\ln x\right)\dfrac{\partial z}{\partial x}=0, z=x^y$	$z=\sqrt{x^2+y^2}, x=3\pm 0,1, y=4\pm 0,2$	$z=3x^2-x^3+3y^2+4y$	$z=4x^2+2y^2+7x$, $D: x^2+y^2\le 1, x+y\ge -1, x\le 0$
5	$x\dfrac{\partial z}{\partial x}+y\dfrac{\partial z}{\partial y}=2z, z=\dfrac{xy}{x+y}$	$z=\sqrt[3]{x^2+y}, x=4\pm 0,01, y=11\pm 0,02$	$z=2x^3-xy^2+5x^2+y^2$	$z=2x^2+y^2+y$, $D: x^2+y^2\le 1, x+y\ge -1, y\le 0$
6	$x^2\dfrac{\partial^2 z}{\partial x^2}+y^2\dfrac{\partial^2 z}{\partial y^2}=0, z=e^{xy}$	$z=\ln\dfrac{x}{y}, x=e\pm 0,1, y=1\pm 0,01$	$z=x^3+8y^3-6xy+1$	$z=x^2+2y^2+x$, $D: x^2+y^2\le 1, x+y\le 1, x\ge 0$
7	$x^2\dfrac{\partial^2 z}{\partial x^2}-y^2\dfrac{\partial^2 z}{\partial y^2}=0, z=y\sqrt{\dfrac{y}{x}}$	$z=\sqrt[3]{2x^2+y}, x=2\pm 0,02, y=1\pm 0,03$	$z=x^3+y^2-3xy$	$z=5x^2-y^2+6y$, $D: x^2+y^2\le 1, x+y\le 1, y\ge 0$
8	$a^2\dfrac{\partial^2 z}{\partial x^2}=\dfrac{\partial^2 z}{\partial y^2}=0, z=\sin^2\left(x-ay\right)$	$z=\dfrac{x}{\sqrt{y+1}}, x=2\pm 0,01, y=3\pm 0,05$	$z=y^2+x^2-xy+2x-y$	$z=2x^2+y^2-3y$, $D: x^2+y^2\le 1, x-y\le 1, y\le 0$
9	$a^2\dfrac{\partial^2 z}{\partial x^2}=\dfrac{\partial^2 z}{\partial y^2}=0, z=e^{-\cos\left(x+ay\right)}$	$z=\sin^2 x\cdot\operatorname{tg} y, x=\dfrac{\pi}{2}\pm 0,02, y=\dfrac{\pi}{4}\pm 0,03$	$z=y^2+3x^2+y-x$	$z=2x^2+y^2-x$, $D: x^2+y^2\le 1, x+y\ge -1, x\le 0$
10	$x\dfrac{\partial z}{\partial x}+y\dfrac{\partial z}{\partial y}=z, z=x\ln\dfrac{y}{x}$	$z=\sqrt{x^2+y^2}, x=4\pm 0,05, y=3\pm 0,07$	$z=x^2y(2-x+y)$	$z=4x^2-3y^2-13y$, $D: x^2+y^2\le 1, x+y\ge -1, y\le 0$
11	$y\dfrac{\partial z}{\partial x}-x\dfrac{\partial z}{\partial y}=0, z=\ln\left(x^2+y^2\right)$	$z=\left(x+y\right)e^{xy}, x=1\pm 0,2, y=1\pm 0,01$	$z=x^2+xy+y^2-3x-6y$	$z=x^2-3y^2-y$, $D: x^2+y^2\le 1, x-y\le 1, y\le 0$
12	$x^2\dfrac{\partial z}{\partial x}-xy\dfrac{\partial z}{\partial y}+y^2=0, z=\dfrac{y^2}{3x}+\arcsin\left(xy\right)$	$z=x\ln\dfrac{y}{x}, x=1\pm 0,2, y=e\pm 0,1$	$z=2x^3-xy^2+5x^2+y^2$	$z=3x^2-y^2-y$, $D: x^2+y^2\le 1, x-y\le 1, y\le 0$

13	$x^2\dfrac{\partial^2 z}{\partial x^2}-2xy\dfrac{\partial^2 z}{\partial x\partial y}+y^2\dfrac{\partial^2 z}{\partial y^2}+2xy=0, z=e^{xy}$	$z=e^y\sin x, x=\dfrac{\pi}{2}\pm 0,01, y=1\pm 0,02$	$z=yx^2\left(1+x+y\right)$	$z=2x^2-3y^2+8x$, $D: x^2+y^2\le 1, x+y\ge -1, x\le 0$
14	$\dfrac{\partial^2 z}{\partial x\partial y}=0, z=\operatorname{arctg}\dfrac{x+y}{1-xy}$	$z=\sqrt{x^2+2xy}, x=2\pm 0,01, y=15\pm 0,2$	$z=7x^2-6xy+3y^2-4x+7y-12$	$z=3x^2+2y^2-4x$, $D: x^2+y^2\le 1, x+y\le 1, x\ge 0$
15	$\dfrac{\partial^2 z}{\partial x^2}+\dfrac{\partial^2 z}{\partial y^2}=0, z=\ln\left(x^2+y^2+2x+1\right)$	$z=\dfrac{y}{x}-\dfrac{x}{y}, x=3\pm 0,3, y=4\pm 0,4$	$z=3x+6y-x^2-xy-y^2$	$z=3x^2+2y^2-y$, $D: x^2+y^2\le 1, x+y\le, y\ge 0$
16	$x\dfrac{\partial z}{\partial x}+y\dfrac{\partial z}{\partial y}+z=0, z=\dfrac{2x+3y}{x^2+y^2}$	$z=\sqrt[3]{y^2-x^3}, x=2\pm 0,05, y=4\pm 0,08$	$z=(2x^2+y^2)e^{-(x^2+y^2)}$	$z=2x^2-y^2-x$, $D: x^2+y^2\le 1, x-y\le 1, x\ge 0$
17	$x\dfrac{\partial z}{\partial x}+y\dfrac{\partial z}{\partial y}=2z, z=\left(x^2+y^2\right)\operatorname{tg}\dfrac{x}{y}$	$z=\sin x\cdot\cos 2y, x=\dfrac{\pi}{2}\pm 0,05, y=\dfrac{\pi}{6}\pm 0,1$	$z=x^3+8y^3-6xy+1$	$z=4x^2+2y^2+7x$, $D: x^2+y^2\le 1, x+y\ge 1, y\le 0$
18	$9\dfrac{\partial^2 z}{\partial x^2}+\dfrac{\partial^2 z}{\partial y^2}=0, z=e^{-(x+3y)}\sin\left(x+3y\right)$	$z=y^x, x=2\pm 0,01, y=5\pm 0,02$	$z=y\sqrt{x}-y^2-x+6y$	$z=2x^2+y^2-3y$, $D: x^2+y^2\le 1, x-y\le -1, x\le 0$
19	$x^2\dfrac{\partial^2 z}{\partial x^2}+2xy\dfrac{\partial^2 z}{\partial x\partial y}+y^2\dfrac{\partial^2 z}{\partial y^2}=0, z=xe^{\frac{y}{x}}$	$z=\sqrt{2x+y^2}, x=2\pm 0,01, y=4\pm 0,02$	$z=1-\sqrt{x^2+y^2}$	$z=4x^2-3y^2-13y$, $D: x^2+y^2\le 1, x-y\ge -1, y\le 0$
20	$\dfrac{\partial^2 z}{\partial x^2}+\dfrac{\partial^2 z}{\partial y^2}=0, z=\operatorname{arctg}\dfrac{y}{x}$	$z=e^{xy}, x=5\pm 0,1, y=0\pm 0,05$	$z=e^{x+2y}(x^2-xy+2y^2)$	$z=3x^2-y^2-y$, $D: x^2+y^2\le 1, x-y\le 1, x\le 0$
21	$x\dfrac{\partial z}{\partial x}+y\dfrac{\partial z}{\partial y}=0, z=\operatorname{arctg}\dfrac{x}{y}$	$z=\sqrt{x^2-y^2}, x=5\pm 0,1, y=4\pm 0,05$	$z=y^2x^3(4-y-x)$	$z=2x^2-y^2-5y$, $D: x^2+y^2\le 1, x-y\le 1, y\le 0$
22	$\dfrac{\partial z}{\partial x}\cdot\dfrac{\partial^2 z}{\partial x\partial y}-\dfrac{\partial z}{\partial y}\cdot\dfrac{\partial^2 z}{\partial x^2}=0, z=\ln\left(x+e^{-y}\right)$	$z=y\ln\dfrac{x}{y}, x=1\pm 0,05, y=e\pm 0,1$	$z=e^{x-2y}(2x+y^2)$	$z=5x^2-y^2+6y$, $D: x^2+y^2\le 1, x+y\le 1, y\ge 0$
23	$x\dfrac{\partial z}{\partial x}+y\dfrac{\partial z}{\partial y}=0, z=\arcsin\dfrac{x}{x+y}$	$z=e^x\cos y, x=1\pm 0,05, y=\dfrac{\pi}{4}\pm 0,01$	$z=2x^2-x+(y+1)^2$	$z=3x^2-y^2-y$, $D: x^2+y^2\le 1, x-y\le 1, y\le 0$
24	$\dfrac{\partial z}{\partial x}+\dfrac{\partial z}{\partial y}=\dfrac{x+y}{x-y}, z=\dfrac{x^2+y^2}{x-y}$	$z=\sqrt{2x^2-3y^2+3}, x=3\pm 0,1, y=2\pm 0,2$	$z=e^{2x+3y}(8x^2-6xy+3y^2)$	$z=2x^2-y^2-x$, $D: x^2+y^2\le 1, x-y\le 1, x\ge 0$
25	$\dfrac{\partial z}{\partial x}+\dfrac{\partial z}{\partial y}=\dfrac{2y}{z}, z=\sqrt{2xy+y^2}$	$z=x^y, x=3\pm 0,1, y=2\pm 0,4$	$z=xy\ln(x^2+y^2)$	$z=4x^2+2y^2+7x$, $D: x^2+y^2\le 1, x+y\ge -1, x\le 0$
26	$\dfrac{\partial^2 z}{\partial x^2}-\dfrac{\partial^2 z}{\partial y^2}=0, z=\ln\left(x^2-y^2\right)$	$z=\operatorname{ctg}x-\operatorname{tg}y, x=\dfrac{\pi}{4}\pm 0,01, y=\dfrac{\pi}{4}\pm 0,1$	$z=3x^2-2x\sqrt{y}+y-8x+8$	$z=4x^2-3y^2-13y$, $D: x^2+y^2\le 1, x-y\ge -1, y\le 0$

27	$a^2\dfrac{\partial^2 z}{\partial x^2}=\dfrac{\partial^2 z}{\partial y^2}=0, z=e^{-\cos(x+ay)}$	$z=\sin^2 x\cdot\operatorname{tg} y, x=\dfrac{\pi}{2}\pm 0,02, y=\dfrac{\pi}{4}\pm 0,03$	$z=y^2+3x^2+y-x$	$z=2x^2+y^2-x$, $D: x^2+y^2\le 1, x+y\ge -1, x\le 0$
28	$\dfrac{\partial^2 z}{\partial x^2}+\dfrac{\partial^2 z}{\partial y^2}=0, z=\ln\left(x^2+(y+1)^2\right)$	$z=x^y, x=2\pm 0,1, y=3\pm 0,3$	$z=xy^2(1-x-y)$	$z=2x^2-y^2-5y$, $D: x^2+y^2\le 1, x-y\le 1, y\le 0$
29	$\dfrac{\partial^2 z}{\partial x^2}+\dfrac{\partial^2 z}{\partial y^2}=0, z=\ln\left(x^2+y^2+2x+1\right)$	$z=\dfrac{y}{x}-\dfrac{x}{y}, x=3\pm 0,3, y=4\pm 0,4$	$z=3x+6y-x^2-xy-y^2$	$z=3x^2+2y^2-y$, $D: x^2+y^2\le 1, x+y\le, y\ge 0$
30	$x\dfrac{\partial z}{\partial x}+y\dfrac{\partial z}{\partial y}=0, z=\arcsin\dfrac{x}{x+y}$	$z=e^x\cos y, x=1\pm 0,05, y=\dfrac{\pi}{4}\pm 0,01$	$z=2x^2-x+(y+1)^2$	$z=3x^2-y^2-y$, $D: x^2+y^2\le 1, x-y\le 1, y\le 0$
31	$x^2\dfrac{\partial^2 z}{\partial x^2}-2xy\dfrac{\partial^2 z}{\partial x\partial y}+y^2\dfrac{\partial^2 z}{\partial y^2}+2xy=0, z=e^{xy}$	$z=e^y\sin x, x=\dfrac{\pi}{2}\pm 0,01, y=1\pm 0,02$	$z=yx^2(1+x+y)$	$z=2x^2-3y^2+8x$, $D: x^2+y^2\le 1, x+y\ge -1, x\le 0$
32	$\dfrac{\partial^2 z}{\partial x^2}+\dfrac{\partial^2 z}{\partial y^2}=0, z=\operatorname{arctg}\dfrac{y}{x}$	$z=e^{xy}, x=5\pm 0,1, y=0\pm 0,05$	$z=e^{x+2y}(x^2-xy+2y^2)$	$z=3x^2-y^2-y$, $D: x^2+y^2\le 1, x-y\le 1, x\le 0$
33	$x^2\dfrac{\partial^2 z}{\partial x^2}-y^2\dfrac{\partial^2 z}{\partial y^2}=0, z=y\sqrt{\dfrac{y}{x}}$	$z=\sqrt[3]{2x^2+y}, x=2\pm 0,02, y=1\pm 0,03$	$z=x^3+y^2-3xy$	$z=5x^2-y^2+6y$, $D: x^2+y^2\le 1, x+y\le 1, y\ge 0$
34	$x\dfrac{\partial z}{\partial x}+y\dfrac{\partial z}{\partial y}=3\left(x^3-y^3\right), z=\ln\dfrac{y}{x}+x^3-y^3$	$z=\dfrac{\sqrt[3]{x+1}}{\sqrt{y}}, x=7\pm 0,1, y=9\pm 0,1$	$z=x^3+xy^2+6xy$	$z=2x^2-y^2+y$, $D: x^2+y^2\le 1, x+y\le 1, y\ge 0$
35	$\dfrac{\partial z}{\partial x}+\dfrac{\partial z}{\partial y}=\dfrac{x+y}{x-y}, z=\dfrac{x^2+y^2}{x-y}$	$z=\sqrt{2x^2-3y^2+3}, x=3\pm 0,1, y=2\pm 0,2$	$z=e^{2x+3y}(8x^2-6xy+3y^2)$	$z=2x^2-y^2-x$, $D: x^2+y^2\le 1, x-y\le 1, x\ge 0$