Вариант 1.
Задача А.

$$x^2 \frac{\partial^2}{\partial x^2} u\,(x,y) + y^2 \frac{\partial^2}{\partial y^2} u\,(x,y) = 0.$$

$x, y > 0$

Задача В.

$$-(2x+\ln y)\frac{\partial^2}{\partial x^2}u(x,y)+2(2xy+y\ln y)\frac{\partial^2}{\partial x\partial y}u(x,y)-\frac{\partial}{\partial x}u(x,y)+2y\frac{\partial}{\partial y}u(x,y)=0.$$

$y > 1$
Начальные данные: $u|_{x=0} = y\sqrt{\ln y}$, $\frac{\partial}{\partial x}u|_{x=0} = y\sqrt{\ln y}$,

Вариант 2.
Задача А.

$$x\,\frac{\partial^2}{\partial x^2} u\,(x,y) + x\,y\,\frac{\partial^2}{\partial x\partial y} u\,(x,y) + y\,u\,(x,y) = 0$$

Задача В.

$$x\frac{\partial^2}{\partial x^2}u(x,y)+2(x-\sqrt{x})\frac{\partial^2}{\partial x\partial y}u(x,y)+(x-2\sqrt{x}+1)\frac{\partial^2}{\partial y^2}u(x,y)+\frac{1}{2}\frac{\partial}{\partial x}u(x,y)+\frac{1}{2}\frac{\partial}{\partial y}u(x,y)=0.$$

$x > 0$
Начальные данные: $u|_{x=9} = 1$, $\frac{\partial}{\partial x}u|_{x=9} = y^2$,

Вариант 3.
Задача А.

$$y\,\frac{\partial^2}{\partial x^2} u\,(x,y) + x\,y\,\frac{\partial^2}{\partial x\partial y} u\,(x,y) + x\,u\,(x,y) = 0.$$

Задача В.

$$2\frac{\partial^2}{\partial x^2}u(x,y) + 4\sqrt{-y}\frac{\partial^2}{\partial x\partial y}u(x,y) - 2y\frac{\partial^2}{\partial y^2}u(x,y) - \frac{\partial}{\partial y}u(x,y) = 0.$$

$y < 0$,
Начальные данные: $u|_{y=-1} = x^3$; $\frac{\partial}{\partial y}u|_{y=-1} = 3x$

Вариант 4.
Задача А.

$$\frac{\partial^2}{\partial x^2}u\left(x,y\right)+2\,\frac{y\,\frac{\partial^2}{\partial x\partial y}u\left(x,y\right)}{x}+\frac{\left(1+y^2\right)y^2\,\frac{\partial^2}{\partial y^2}u\left(x,y\right)}{x^2}+\frac{y^3\,\frac{\partial}{\partial y}u\left(x,y\right)}{x^2}=0$$

Задача В.

$$\frac{\partial^2}{\partial x\partial y}u(x,y)+x\frac{\partial^2}{\partial y^2}u(x,y)=0.$$

$x<0, y>0,$
Начальные данные: $u|_{y=2}=x^2$; $\frac{\partial}{\partial y}u|_{y=2}=e^x$

Вариант 5.
Задача А.

$$\frac{\partial^2}{\partial x^2}u\left(x,y\right)-2\,\frac{y\,\frac{\partial^2}{\partial x\partial y}u\left(x,y\right)}{x}+\frac{y^3\,\frac{\partial}{\partial y}u\left(x,y\right)}{x^2}=0.$$

Задача В.

$$-x^2\frac{\partial^2}{\partial x^2}u(x,y)+2xy\frac{\partial^2}{\partial x\partial y}u(x,y)-y^2\frac{\partial^2}{\partial y^2}u(x,y)-x\frac{\partial}{\partial x}u(x,y)-y\frac{\partial}{\partial y}u(x,y)=0.$$

$x>0, y>0$
Начальные данные: $u|_{x=1}=y$, $\frac{\partial}{\partial x}u|_{x=1}=1$,

Вариант 6.
Задача А.

$$(x+y)\,\frac{\partial^2}{\partial x^2}u\left(x,y\right)+\frac{\partial^2}{\partial x\partial y}u\left(x,y\right)+(x-y)\,\frac{\partial}{\partial y}u\left(x,y\right)=0.$$

Задача В.

$$(1+x^2)\frac{\partial^2}{\partial x^2}u(x,y)-2x\sqrt{1+x^2}\frac{\partial^2}{\partial x\partial y}u(x,y)+x^2\frac{\partial^2}{\partial y^2}u(x,y)-\frac{1}{x}\frac{\partial}{\partial x}u(x,y)=0.$$

$x>1$
Начальные данные: $u|_{y=0}=x^3$; $\frac{\partial}{\partial y}u|_{y=0}=x^2$,

Вариант 7.
Задача А.

$$(x-y)\frac{\partial^2}{\partial x^2}u(x,y)+\frac{\partial^2}{\partial x\partial y}u(x,y)+(x+y)\frac{\partial}{\partial y}u(x,y)=0$$

Задача В.

$$y^2\frac{\partial^2}{\partial x^2}u(x,y)-2y\frac{\partial^2}{\partial x\partial y}u(x,y)+\frac{\partial^2}{\partial y^2}u(x,y)-\frac{\partial}{\partial x}u(x,y)=0.$$

$y>0$
Начальные данные: $u|_{y=1}=x$; $\frac{\partial}{\partial y}u|_{y=1}=x$,

Вариант 8.
Задача А.

$$\frac{x\frac{\partial^2}{\partial x^2}u(x,y)}{y}+\frac{y\frac{\partial^2}{\partial x\partial y}u(x,y)}{x}+\frac{\partial}{\partial x}u(x,y)=0.$$

Задача В.

$$2x\frac{\partial^2}{\partial x^2}u(x,y)+4x\sqrt{-x}\frac{\partial^2}{\partial x\partial y}u(x,y)-2x^2\frac{\partial^2}{\partial y^2}u(x,y)-\frac{\partial}{\partial x}u(x,y)=0.$$

$x<0$
Начальные данные: $u|_{x=-1}=y^2$, $\frac{\partial}{\partial x}u|_{x=-1}=y$,

Вариант 9.
Задача А.

$$\frac{x\frac{\partial^2}{\partial x^2}u(x,y)}{y}+2\frac{\partial^2}{\partial x\partial y}u(x,y)+\frac{y\frac{\partial^2}{\partial y^2}u(x,y)}{x}+\frac{\partial}{\partial y}u(x,y)=0.$$

Задача В.

$$xy\frac{\partial^2}{\partial x^2}u(x,y)-2x^2y\frac{\partial^2}{\partial x\partial y}u(x,y)-(x^2+y)\frac{\partial}{\partial x}u(x,y)=0.$$

$x>0, y>0$
Начальные данные: $u|_{x=1}=y^2$, $\frac{\partial}{\partial x}u|_{x=1}=5y$,

Вариант 10.
Задача А.

$$\frac{x\,\frac{\partial^2}{\partial x^2}u\,(x,y)}{y}+2\,\frac{\partial^2}{\partial x\partial y}u\,(x,y)+\frac{y\,\frac{\partial^2}{\partial y^2}u\,(x,y)}{x}+(1+x)\,x^2\,\frac{\partial}{\partial y}u\,(x,y)+u\,(x,y)=0.$$

Задача В.

$$x^2\frac{\partial^2}{\partial x^2}u(x,y)-xy\frac{\partial^2}{\partial x\partial y}u(x,y)+\frac{x}{2}\frac{\partial}{\partial x}u(x,y)+\frac{y}{2}\frac{\partial}{\partial y}u(x,y)=0.$$

$y>0$,
Начальные данные: $u|_{x=1}=y\sqrt{y}$, $\frac{\partial}{\partial x}u|_{x=1}=y^2$,

Вариант 11.
Задача А.

$$\left(1+x^2\right)^2\,\frac{\partial^2}{\partial x^2}u\,(x,y)+\frac{\partial^2}{\partial y^2}u\,(x,y)+3\,y^2x\,\frac{\partial}{\partial y}u\,(x,y)=0$$

Задача В.

$$y\frac{\partial^2}{\partial x^2}u(x,y)+2\sqrt{-xy}\frac{\partial^2}{\partial x\partial y}u(x,y)-x\frac{\partial^2}{\partial y^2}u(x,y)+\frac{x}{2y}\frac{\partial}{\partial y}u(x,y)-\frac{y}{2x}\frac{\partial}{\partial x}u(x,y)=0.$$

$x<0, y>0$,
Начальные данные: $u|_{x=-4}=y$, $\frac{\partial}{\partial x}u|_{x=-4}=1$,

Вариант 12.
Задача А.

$$x^2\frac{\partial^2}{\partial x^2}u\,(x,y)-y^2\frac{\partial^2}{\partial y^2}u\,(x,y)+e^{x\,y}\frac{\partial}{\partial y}u\,(x,y)=0.$$

Задача В.

$$y\frac{\partial^2}{\partial x^2}u(x,y)+2x\sqrt{-y}\frac{\partial^2}{\partial x\partial y}u(x,y)-x^2\frac{\partial^2}{\partial y^2}u(x,y)-\frac{y}{x}\frac{\partial}{\partial x}u(x,y)+\frac{x^2}{2y}\frac{\partial}{\partial y}u(x,y)=0.$$

$x>0, y<0$,
Начальные данные: $u|_{y=-1}=x^2$, $\frac{\partial}{\partial y}u|_{y=-1}=x$,

Вариант 13.
Задача А.

$$\frac{\partial^2}{\partial x^2}u\left(x,y\right)-2\,\sin x\frac{\partial^2}{\partial x\partial y}u\left(x,y\right)-\cos^2 x\frac{\partial^2}{\partial y^2}u\left(x,y\right)-\cos x\frac{\partial}{\partial y}u\left(x,y\right)=0$$

Задача В.

$$x\frac{\partial^2}{\partial x^2}u(x,y)+2y\sqrt{-x}\frac{\partial^2}{\partial x\partial y}u(x,y)-y^2\frac{\partial^2}{\partial y^2}u(x,y)+\frac{1}{2}\frac{\partial}{\partial x}u(x,y)-y\frac{\partial}{\partial y}u(x,y)=0.$$

$x<0, y>0,$
Начальные данные: $u|_{y=1}=x$, $\frac{\partial}{\partial y}u|_{y=1}=x^2$,

Вариант 14.
Задача А.

$$y\,\frac{\partial^2}{\partial x^2}u\left(x,y\right)-x\,y\,\frac{\partial^2}{\partial x\partial y}u\left(x,y\right)+y\,\frac{\partial}{\partial y}u\left(x,y\right)=0.$$

Задача В.

$$x^2\frac{\partial^2}{\partial x^2}u(x,y)-2x\frac{\partial^2}{\partial x\partial y}u(x,y)+\frac{\partial^2}{\partial y^2}u(x,y)+2\frac{\partial}{\partial x}u(x,y)+\left(1-\frac{2}{x}\right)\frac{\partial}{\partial y}u(x,y)=0.$$

$x>0$
Начальные данные: $u|_{y=0}=\ln x$, $\frac{\partial}{\partial y}u|_{y=0}=1$,

Вариант 15.
Задача А.

$$y^2\frac{\partial^2}{\partial x^2}u\left(x,y\right)+x^2\frac{\partial^2}{\partial y^2}u\left(x,y\right)+\left(1-x^2\right)\frac{\partial}{\partial y}u\left(x,y\right)=0$$

Задача В.

$$x(\sqrt{-y}+\sqrt{x})\frac{\partial^2}{\partial x^2}u(x,y)+y(\sqrt{x}+\sqrt{-y})\frac{\partial^2}{\partial y^2}u(x,y)+\frac{\sqrt{-y}}{2}\frac{\partial}{\partial x}u(x,y)+\frac{\sqrt{x}}{2}\frac{\partial}{\partial y}u(x,y)=0.$$

$x>0, y<0,$
Начальные данные: $u|_{y=-1}=\frac{2}{3}\,x\sqrt{x}+x$, $\frac{\partial}{\partial y}u|_{y=-1}=\sqrt{x}+1$,

Вариант 16.
Задача А.

$$\frac{\partial^2}{\partial x^2}u\left(x,y\right)-2\,\cos x\frac{\partial^2}{\partial x\partial y}u\left(x,y\right)-\sin^2 x\frac{\partial^2}{\partial y^2}u\left(x,y\right)-\cos x\frac{\partial}{\partial y}u\left(x,y\right)=0.$$

Задача В.

$$x\frac{\partial^2}{\partial x^2}u(x,y)-4x^2\frac{\partial^2}{\partial x\partial y}u(x,y)+4x^3\frac{\partial^2}{\partial y^2}u(x,y)-\frac{\partial}{\partial x}u(x,y)=0.$$

$x>0$
Начальные данные: $u|_{y=0}=e^x$, $\frac{\partial}{\partial y}u|_{y=0}=x^2$,

Вариант 17.
Задача А.

$$\frac{\frac{\partial^2}{\partial x^2}u\left(x,y\right)}{\cos x}-2\,\tan x\frac{\partial^2}{\partial x\partial y}u\left(x,y\right)-\cos x\frac{\partial^2}{\partial y^2}u\left(x,y\right)-\frac{\partial}{\partial x}u\left(x,y\right)=0.$$

Задача В.

$$x^2\frac{\partial^2}{\partial x^2}u(x,y)-2xy\frac{\partial^2}{\partial x\partial y}u(x,y)+y^2\frac{\partial^2}{\partial y^2}u(x,y)+3x\frac{\partial}{\partial x}u(x,y)-y\frac{\partial}{\partial y}u(x,y)=0.$$

$x>0, y>0$
Начальные данные: $u|_{x=1}=y^3$, $\frac{\partial}{\partial x}u|_{x=1}=y$,

Вариант 18.
Задача А.

$$|x|\,\frac{\partial^2}{\partial x^2}u\left(x,y\right)-y\,\frac{\partial^2}{\partial x\partial y}u\left(x,y\right)-\frac{\partial}{\partial x}u\left(x,y\right)=0,$$

$x<0$.

Задача В.

$$y^3\frac{\partial^2}{\partial x^2}u(x,y)-2y^2\frac{\partial^2}{\partial x\partial y}u(x,y)+y\frac{\partial^2}{\partial y^2}u(x,y)-(y+2)\frac{\partial}{\partial x}u(x,y)+\frac{2}{y}\frac{\partial}{\partial y}u(x,y)=0.$$

$y>0$,
Начальные данные: $u|_{x=0}=y$, $\frac{\partial}{\partial x}u|_{x=0}=\frac{1}{y}$,

Вариант 19.
Задача А.

$$|x|\frac{\partial^2}{\partial x^2}u\left(x,y\right)-y\frac{\partial^2}{\partial x\partial y}u\left(x,y\right)-\frac{\partial}{\partial x}u\left(x,y\right)+|y-1|\,u\left(x,y\right)=0,$$

$x<0, y<1.$

Задача В.

$$x^2\frac{\partial^2}{\partial x^2}u(x,y)-2xy\frac{\partial^2}{\partial x\partial y}u(x,y)+y^2\frac{\partial^2}{\partial y^2}u(x,y)-7x\frac{\partial}{\partial x}u(x,y)+9y\frac{\partial}{\partial y}u(x,y)=0.$$

$x>0, y>0,$
Начальные данные: $u|_{y=1}=x^2$, $\frac{\partial}{\partial y}u|_{y=1}=x^2$,

Вариант 20.
Задача А.

$$\left(1+x^2\right)\frac{\partial^2}{\partial x^2}u\left(x,y\right)+2\,x\,\frac{\partial^2}{\partial x\partial y}u\left(x,y\right)+|y|\,\frac{\partial}{\partial x}u\left(x,y\right)=0,$$

$y>0.$

Задача В.

$$x^2\frac{\partial^2}{\partial x^2}u(x,y)-2x\frac{\partial^2}{\partial x\partial y}u(x,y)+\frac{\partial^2}{\partial y^2}u(x,y)+\frac{\partial}{\partial y}u(x,y)=0.$$

$x>0$
Начальные данные: $u|_{y=0}=x\ln x-x$, $\frac{\partial}{\partial y}u|_{y=0}=x^2$,

Вариант 21.
Задача А.

$$\frac{\partial^2}{\partial x^2}u\left(x,y\right)+2\,y\,\frac{\partial^2}{\partial x\partial y}u\left(x,y\right)+|x|\,\frac{\partial}{\partial y}u\left(x,y\right)+e^x u\left(x,y\right)=0,$$

$x<0.$

Задача В.

$$\frac{\partial^2}{\partial x^2}u(x,y)+2x\frac{\partial^2}{\partial x\partial y}u(x,y)+x^2\frac{\partial^2}{\partial y^2}u(x,y)+\frac{1}{x}\frac{\partial}{\partial x}u(x,y)+2\frac{\partial}{\partial y}u(x,y)=0.$$

Начальные данные: $u|_{y=0}=x^4$, $\frac{\partial}{\partial y}u|_{y=0}=x^2$,

Вариант 22.
Задача А.

$$\frac{\frac{\partial^2}{\partial x^2}u\left(x,y\right)}{y}+\frac{\partial^2}{\partial x\partial y}u\left(x,y\right)+\left|x\right|y\,\frac{\partial}{\partial x}u\left(x,y\right)=0,$$

$x<0$.

Задача В.

$$y^2\frac{\partial^2}{\partial x^2}u(x,y)-2y\frac{\partial^2}{\partial x\partial y}u(x,y)+\frac{\partial^2}{\partial y^2}u(x,y)-2\frac{\partial}{\partial x}u(x,y)+\frac{1}{y}\frac{\partial}{\partial y}u(x,y)=0.$$

$y>0$,
Начальные данные: $u|_{x=0}=y^2$, $\frac{\partial}{\partial x}u|_{x=0}=y^2$,

Вариант 23.
Задача А.

$$x^2\frac{\partial^2}{\partial x^2}u\left(x,y\right)+2\,x\,y\,\frac{\partial^2}{\partial x\partial y}u\left(x,y\right)+y^2\frac{\partial^2}{\partial y^2}u\left(x,y\right)+\left|x\right|y\,\frac{\partial}{\partial y}u\left(x,y\right)=0,$$

$x<0$.

Задача В.

$$\frac{\partial^2}{\partial x^2}u(x,y)-2y\frac{\partial^2}{\partial x\partial y}u(x,y)=0.$$

Начальные данные: $u|_{x=0}=y$, $\frac{\partial}{\partial x}u|_{x=0}=ye^y$,

Вариант 24.
Задача А.

$$\frac{\partial^2}{\partial x^2}u\left(x,y\right)+2\,x\,y\,\frac{\partial^2}{\partial x\partial y}u\left(x,y\right)+x^2u\left(x,y\right)=0.$$

Задача В.

$$x^2\frac{\partial^2}{\partial x^2}u(x,y)-2xy\frac{\partial^2}{\partial x\partial y}u(x,y)+y^2\frac{\partial^2}{\partial y^2}u(x,y)+2\left(x-\frac{x}{y}\right)\frac{\partial}{\partial x}u(x,y)+2\frac{\partial}{\partial y}u(x,y)=0.$$

Начальные данные: $u|_{x=1}=e^y$, $\frac{\partial}{\partial x}u|_{x=1}=ye^y$,

Вариант 25.
Задача А.

$$(x-2\,y)\,\frac{\partial^2}{\partial x^2}u\,(x,y)+\frac{\partial^2}{\partial x\partial y}u\,(x,y)+x\,\frac{\partial}{\partial x}u\,(x,y)=0.$$

Задача В.

$$x\frac{\partial^2}{\partial x^2}u(x,y)+2\sqrt{-xy}\frac{\partial^2}{\partial x\partial y}u(x,y)-y\frac{\partial^2}{\partial y^2}u(x,y)+\frac{1}{2}\frac{\partial}{\partial x}u(x,y)-\frac{1}{2}\frac{\partial}{\partial y}u(x,y)=0.$$

$x>0, y<0,$
Начальные данные: $u|_{x=4}=y$, $\frac{\partial}{\partial x}u|_{x=4}=1$,

Вариант 26.
Задача В.

$$x^2\frac{\partial^2}{\partial x^2}u(x,y)+2xy\frac{\partial^2}{\partial x\partial y}u(x,y)-3y^2\frac{\partial^2}{\partial y^2}u(x,y)+3x\frac{\partial}{\partial x}u(x,y)+3y\frac{\partial}{\partial y}u(x,y)=0.$$

$x>0, y>0,$
Начальные данные: $u|_{y=1}=x^2$, $\frac{\partial}{\partial y}u|_{y=1}=x$,

Вариант 27.
Задача В.

$$2\frac{\partial^2}{\partial x\partial y}u(x,y)+2x\frac{\partial^2}{\partial y^2}u(x,y)+\frac{1}{x}\frac{\partial}{\partial y}u(x,y)=0.$$

$x>0$
Начальные данные: $u|_{y=0}=x^2$, $\frac{\partial}{\partial y}u|_{y=0}=-2$,

Вариант 28.
Задача В.

$$(4\sqrt{-y}+2x)\frac{\partial^2}{\partial x^2}u(x,y)+2(xy+2y\sqrt{-y})\frac{\partial^2}{\partial y^2}u(x,y)-2\frac{\partial}{\partial x}u(x,y)+x\frac{\partial}{\partial y}u(x,y)=0.$$

$y<0$
Начальные данные: $u|_{x=0}=(-y)^{5/4}$, $\frac{\partial}{\partial x}u|_{x=0}=(-y)^{1/4}$,

Вариант 29.
Задача В.

$$x\frac{\partial^2}{\partial x^2}u(x,y)-y\frac{\partial^2}{\partial x\partial y}u(x,y)+\frac{1}{2}\frac{\partial}{\partial x}u(x,y)=0.$$

Начальные данные: $u|_{x=1}=y^2$, $\frac{\partial}{\partial x}u|_{x=1}=2y^2$,

Вариант 30.
Задача В.

$$x^2\frac{\partial^2}{\partial x^2}u(x,y)+2xy\frac{\partial^2}{\partial x\partial y}u(x,y)-3y^2\frac{\partial^2}{\partial y^2}u(x,y)-x\frac{\partial}{\partial x}u(x,y)-y\frac{\partial}{\partial y}u(x,y)=0.$$

$x>0, y>0,$

Начальные данные: $u|_{x=1}=\ln y$, $\frac{\partial}{\partial x}u|_{x=1}=\frac{1}{y}$,