ИНДИВИДУАЛЬНЫЕ ЗАДАНИЯ

Задача 1.

Найти общий интервал дифференциального уравнения (ответ представить в виде $\varphi(x,y)=C$ или в явном виде.

1.1. $7xdx-8x^2ydy=6ydy-3xy^2$

1.2. $x^2\sqrt{4+y^2}+y'\sqrt{2+x^3}=0$

1.3. $\sqrt{1+y^2}dx-2ydy=y\sin^2 xdy$

1.1. $4xdx-3ydy=3x^2ydy-2xy^2dx.$

1.2. $x\sqrt{1+y^2}+yy'\sqrt{1+x^2}=0.$

1.3. $\sqrt{4+y^2}dx-ydy=x^2ydy.$

1.4. $\sqrt{3+y^2}dx-ydy=x^2ydy.$

1.5. $6xdx-6ydy=2x^2ydy+3y^2dx.$

1.6. $x\sqrt{3+y^2}dx+y\sqrt{2+x^2}dy=0.$

1.7. $(e^{2x}+5)dy+ye^{2x}dx=0.$

1.8. $yy'\sqrt{\frac{2+x^2}{1-y^2}}+2x=0$

1.9. $6xdx-6ydy=3x^2ydy-2xy^2dx.$

1.10. $x\sqrt{5+y^2}dx+y\sqrt{4+x^2}dy=0.$

1.11. $y(4+e^x)dy-e^xdx=0.$

1.12. $\sqrt{4-x^2}y'+xy^2+x=0.$

1.13. $2xdx - 2ydy = x^2 ydy - 2xy^2 dx.$

1.14. $x\sqrt{4+y^2}dx + y\sqrt{1+x^2}dy = 0.$

1.15. $(e^x + 8)dy - ye^x dx = 0.$

1.16. $\sqrt{5+y^2} + yy'\sqrt{1-x^2} = 0.$

1.17. $6xdx - ydy = yx^2 dy - 3xy^2 dx.$

1.18. $y\ln y + xy' = 0.$

1.19. $(1+e^x)y' = ye^x.$

1.20. $\sqrt{1-x^2}y' + xy^2 + x = 0.$

1.21. $6xdx - 2ydy = 2yx^2 dy - 3xy^2 dx.$

1.22 $y(1+\ln y) + xy' = 0.$

1.23. $\left(3+e^x\right)yy' = e^x.$

1.24. $\sqrt{3+y^2} + \sqrt{1-x^2}\,yy' = 0.$

Задача 2.

Найти общий интеграл дифференциального уравнения.

2.1. $3y' = 2\frac{y^2}{x^2} + 3\frac{y}{x} - 7$

2.2. $xy' = \frac{2y^3 + 2yx^2}{2y^2 + 4x^2}$

2.3. $y' = \frac{x+3y}{3y-2x}$

2.4. $xy' = \sqrt{x^2+y^2} + y$

2.5. $2y' = \frac{y^2}{x^2} + 6\frac{y}{x} + 3.$

2.6. $xy' = \frac{3y^3 + 4yx^2}{2y^2 + 2x^2}.$

2.7. $y' = \dfrac{x+2y}{2x-y}.$

2.8. $xy' = 2\sqrt{x^2+y^2} + y.$

2.9. $3y' = \dfrac{y^2}{x^2} + 8\dfrac{y}{x} + 4.$

2.10. $xy' = \dfrac{3y^3+6yx^2}{2y^2+3x^2}.$

2.11. $y' = \dfrac{x^2+xy-y^2}{x^2-2xy}.$

2.12. $xy' = \sqrt{2x^2+y^2} + y.$

2.13. $y' = \dfrac{y^2}{x^2} + 6\dfrac{y}{x} + 6.$

2.14. $xy' = \dfrac{3y^3+8yx^2}{2y^2+4x^2}.$

2.15. $y' = \dfrac{x^2+2xy-y^2}{2x^2-2xy}.$

2.16. $xy' = 3\sqrt{x^2+y^2} + y.$

2.17. $2y' = \dfrac{y^2}{x^2} + 8\dfrac{y}{x} + 8.$

2.18. $xy' = \dfrac{3y^3+10yx^2}{2y^2+5x^2}.$

2.19. $y' = \dfrac{x^2+3xy-y^2}{3x^2-2xy}.$

2.20. $xy' = 3\sqrt{2x^2+y^2} + y.$

2.21. $y' = \dfrac{y^2}{x^2} + 8\dfrac{y}{x} + 12.$

2.22. $xy' = \dfrac{3y^3+12yx^2}{2y^2+6x^2}.$

2.23. $y' = \dfrac{x^2+xy-3y^2}{x^2-4xy}.$

2.24. $xy' = 2\sqrt{2x^2+y^2} + y.$

Задача 3

Найти решение задачи Коши.

3.1. $y' - y = x\sin x, \qquad y(0) = 0$

3.2. $y' - y^2 x = 2x\sin x, \qquad y\left(\dfrac{\pi}{2}\right) = 0$

3.3. $y' - y\sin x = \cos x, \quad y(0) = 0$

3.4. $y' + ytgx = cos^2 x, \qquad y\left(\frac{\pi}{4}\right) = \frac{1}{2}.$

3.5. $y' - \frac{y}{x+2} = x^2 + 2x, \qquad y(-1) = \frac{3}{2}.$

3.6. $y' - \frac{1}{x+1}y = e^x(x+1), \qquad y(0) = 1.$

3.7. $y' - \frac{y}{x} = x\,sin\,x, \qquad y\left(\frac{\pi}{2}\right) = 1.$

3.8. $y' + \frac{y}{x} = sin\,x, \qquad y(\pi) = \frac{1}{\pi}.$

3.9. $y' + \frac{y}{2x} = x^2, \qquad y(1) = 1.$

3.10. $y' + \frac{2xy}{1+x^2} = \frac{2x^2}{1+x^2}, \qquad y(0) = \frac{2}{3}.$

3.11. $y' - \frac{2x-5}{x^2}y = 5, \qquad y(2) = 4.$

3.12. $y' + \frac{y}{x} = \frac{x+1}{x}e^x, \qquad y(1) = e.$

3.13. $y' - \frac{y}{x} = -2\frac{ln\,x}{x},, \qquad y(1) = 1.$

3.14. $y' - \frac{y}{x} = -\frac{8}{x^2}, \qquad y(1) = 4.$

3.15. $y' + \frac{2}{x}y = x^3, \qquad y(1) = -\frac{5}{6}.$

3.16. $y' + \frac{y}{x} = 3x, \qquad y(1) = 1.$

3.17. $y' - \frac{2xy}{1+x^2} = 1 + x^2, \qquad y(1) = 3.$

3.18. $y' + \frac{1-2x}{x^2} y = 1, \qquad y(1) = 1.$

3.19. $y' + \frac{3y}{x} = \frac{2}{x^3}, \qquad y(1) = 1.$

3.21. $y' + \frac{xy}{2\left(1-x^2\right)} = \frac{x}{2}, \qquad y(0) = \frac{2}{3}.$

3.22. $y' + xy = -x^3, \qquad y(0) = 3.$

3.23. $y' - \frac{2}{x+1} y = e^x (x+1)^2, \qquad y(0) = 1.$

3.24. $y' + 2xy = xe^{-x^2} \sin x, \qquad y(0) = 1.$