
Контрольная работа 1
Вариант 1

1. $y' = \dfrac{1}{y(1+x^2)}\,,\ \ y(0) = 1$

2. $y' = 2xy + (3x-1)\mathrm{e}^{x(3+x)}$

3. $(x^2\cos(y+3)+1)dy + 2x\sin(y+3)dx = 0\,,\ \ y(0) = -3$

4. $\sqrt{y}\cdot y' = x\cos x$

5. $y' = \dfrac{\cos x}{\operatorname{tg} y}\,,\ \ y(0) = 0$

6. $y' + \dfrac{y}{x} = \dfrac{\mathrm{e}^{3x}}{5y^4}\left(\dfrac{2}{x^5} - \dfrac{3}{x^4}\right)$

7. $y' = \dfrac{x^2\mathrm{e}^x}{\sqrt{y}}\,,\ \ y(0) = 1$

8. $y' + \dfrac{y}{2x} = \left(2\sqrt{x} - \dfrac{3}{\sqrt{x}}\right)\mathrm{e}^{-5x}$

9. $y' = (1-\mathrm{e}^{-y})x\,,\ \ y(1) = 1$

10. $y' + 3x^2y = (5x-6)\mathrm{e}^{x(4-x^2)}$

11. $y'' + 2y' + 10y = \mathrm{e}^x$

12. $y'' - 2y' - 3y = 7\,,\quad y(0) = 0\,,\ \ y'(0) = 1$

Контрольная работа 1.
Вариант 2

1. $y' = \dfrac{\sin x}{\operatorname{tg} y}\,,\ \ y\left(\dfrac{\pi}{2}\right) = 0$

2. $y' - \dfrac{y}{2x} = (5\sqrt{x} - 3x\sqrt{x})\mathrm{e}^{5x}$

3. $y' = \dfrac{x(1+y^2)}{y}\,,\ \ y(0) = 2$

4. $y' = \dfrac{4y}{x} + \mathrm{e}^{-x}(3x^5 + 2x^4)$

5. $y' = (1+\mathrm{e}^{-4y})\cos x\,,\ \ y(\pi) = 0$

6. $y' - x^2y = \dfrac{6x+5}{3y^2}\mathrm{e}^{x(4+x^2)}$

7. $y' = \dfrac{\sin(x+y) - \cos(x+y)}{\cos(x+y) - \sin(x+y) + 2y}\,,\ \ y\left(\dfrac{\pi}{2}\right) = 0$

8. $\dfrac{y'}{\sqrt{y}} = \dfrac{x\sqrt{x}-1}{x}$

9. $y' = -\dfrac{y+\mathrm{e}^y}{x(1+\mathrm{e}^y)}\,,\ \ y(1)=0$

10. $yy' = \dfrac{\operatorname{ctg} x}{\cos y}$

11. $y''-2y'+10y = \mathrm{e}^{-x}$

12. $y''+2y'-3y = \mathrm{e}^{-3x}\,,\quad y(0)=1\,,\ \ y'(0)=0$

Контрольная работа 1
Вариант 3

1. $y' = -\dfrac{1+\mathrm{e}^x}{(x+\mathrm{e}^x)\sin y}\,,\ \ y(0)=\dfrac{\pi}{2}$

2. $y' = 4xy + \mathrm{e}^{2x^2+5x}(3x+2)$

3. $(x^2+2xy+2x+2y)\mathrm{e}^x dx + 2x\mathrm{e}^x dy = 0\,,\ \ y(0)=3$

4. $y' = \mathrm{e}^{2x+y}$

5. $y\sin x + y'\cos x = 0\,,\ \ y(0)=2$

6. $y' = \dfrac{2y}{x} + 9x^3\mathrm{e}^{3x}$

7. $x\left(\dfrac{1}{y^2}+\mathrm{e}^y\right)y' = \dfrac{1}{y}-\mathrm{e}^y\,,\ \ y(1)=1$

8. $y' = xy^2\cos 2x$

9. $y' + \dfrac{y}{x^2} = (8x+2)\mathrm{e}^{5x+1/(2x)}\sqrt{y}$

10. $\left(2x-\dfrac{1}{x^2}+y\right)dx + x\,dy = 0\,,\ \ y(1)=1$

11. $y''-4y'+5y = x$

12. $y''+y' = \mathrm{e}^x\,,\quad y(1)=\mathrm{e}\,,\ \ y'(1)=0$

Контрольная работа 1
Вариант 4

1. $((x+1)\mathrm{e}^{x+y}+3x\sin x)dx+x\mathrm{e}^{x+y}dy=0\,,\ \ y(0)=3$

2. $\mathrm{e}^{3x-7y}y'=(2x+3)\mathrm{e}^{2x+y}$

3. $y\cos x+y'\sin x=0\,,\ \ y\left(\dfrac{\pi}{2}\right)=2$

4. $y'=\dfrac{2y}{x}+(3x^3-2x^2)\mathrm{e}^{4x}$

5. $yy'=x\sqrt{y^2-1}\,,\ \ y(0)=1$

6. $y'=3x^2y+(4x+5)\mathrm{e}^{x(2+x^2)}$

7. $y'=\dfrac{\sqrt{1+x}}{y}\,,\ \ y(0)=1$

8. $y'=\dfrac{y}{x}+(8x\sqrt{x}+4\sqrt{x})\mathrm{e}^{6x}\sqrt{y}$

9. $\mathrm{e}^{y}y'=(1+\mathrm{e}^{y})\sin x\,,\ \ y(0)=0$

10. $y'-4xy=(2-3x)\mathrm{e}^{x(2x-1)}$

11. $y''+4y'+5y=2x+1$

12. $y''-y'=6\,,\quad y(1)=0\,,\ \ y'(1)=\mathrm{e}$

Контрольная работа 1
Вариант 5

1. $y'=\dfrac{\sqrt{1+x}}{y}\,,\ \ y(0)=1$

2. $y'=\dfrac{y}{x}+(9x-6)\mathrm{e}^{6x}\sqrt[3]{xy^2}$

3. $\mathrm{e}^{y}y'=(1+\mathrm{e}^{2y})\sin x\,,\ \ y(0)=0$

4. $y'+2xy=(2-3x)\mathrm{e}^{x(1-x)}$

5. $y'=\dfrac{y}{x^2}+(6x-1)\mathrm{e}^{3x-1/x}$

6. $y'=\dfrac{\cos y+y\cos x}{x\sin y-\sin x}\,,\ \ y(0)=0$

7. $y'=\dfrac{\sin x}{\operatorname{tg} y}\,,\ \ y\left(\dfrac{\pi}{2}\right)=0$

8. $y'+\dfrac{y}{2x}=\left(2\sqrt{x}-\dfrac{3}{\sqrt{x}}\right)\mathrm{e}^{-5x}$

9. $\left(\ln x - \dfrac{1}{y^2}\right) y' = -\dfrac{y}{x}\,,\ \ y(1) = 1$

10. $\sin x \sqrt[4]{y} \cdot y' = \cos x$

11. $y'' - 6y' + 10y = \mathrm{e}^{4x}$

12. $y'' - 4y = 4\,,\quad y(0) = 1\,,\ \ y'(0) = 1$

Контрольная работа 1
Вариант 6

1. $x^2 y' + y = 0\,,\ \ y(1) = 2$

2. $x + xy + y'(y + xy) = 0$

3. $y' = (2y + 1)\operatorname{ctg} x\,,\ \ y\left(\dfrac{\pi}{4}\right) = \dfrac{1}{2}$

4. $\left(\sin x - \dfrac{1}{y^2}\right) dy + (\sin x + (x + y)\cos x)dx = 0\,,\ \ y(\pi) = 1$

5. $(1 + \mathrm{e}^x)y' = y\mathrm{e}^{2x}\,,\ \ y(0) = 1$

6. $\left(4 - \dfrac{y^2}{x^2}\right) dx + \dfrac{2y}{x}\, dy = 0$

7. $3x^2\mathrm{e}^y dx + (x^3\mathrm{e}^y - 1)dy = 0$

8. $y' = \dfrac{5y}{x} + \mathrm{e}^{-x}(x^6 + x^5)\,,\ \ y(1) = 1$

9. $y' - 4y \operatorname{tg} x = 2y^{3/4}$

10. $y' + 2xy = 2x\mathrm{e}^{-x^2} \sin x$

11. $y'' + 6y' + 10y = \mathrm{e}^{-3x}$

12. $y'' - 9y = \mathrm{e}^{3x}\,,\quad y(0) = \mathrm{e}\,,\ \ y'(0) = 0$

Контрольная работа 1
Вариант 7

1. $x^2 y' + y^2 = 0\,,\ \ y(-1) = 1$

2. $(1 + \mathrm{e}^x)yy' = \mathrm{e}^x\,,\ \ y(0) = 1$

3. $y' \sin^2 x = y \ln y \cos x\,,\ \ y\left(\dfrac{\pi}{4}\right) = \mathrm{e}$

4. $y' - 4y = \mathrm{e}^{2x}(2x + 2)$

5. $y' - \dfrac{2y}{x} = (x^4 - 3x^2)\sin x$

6. $y' + xy = \dfrac{3 - 4x}{2y}\mathrm{e}^{x(2-x)}$

7. $y' + y\cos x = \sin x \cos x\,,\ \ y(0) = 1$

8. $\left(\dfrac{2}{y^2} - \dfrac{x}{y}\right) y' = \ln y$

9. $(\mathrm{e}^{2x} + x)dy = -y(1 + 2\mathrm{e}^{2x})dx\,,\ \ y(0) = 2$

10. $(x\sin y - \sin x)dy = (\cos y + y\cos x)dx$

11. $y'' + 4y = x$

12. $y'' - 7y' + 6y = 5\mathrm{e}^{6x}\,,\quad y(1) = 0\,,\ \ y'(1) = \mathrm{e}$

Контрольная работа 1
Вариант 8

1. $x^2y' - 3y = 0$

2. $2y'\sqrt{x} = y\,,\ \ y(4) = 1$

3. $(x^2 + x)y' = 2y + 1$

4. $xy' - y = 2x$

5. $y' + y = \mathrm{e}^{-x}\cos(2x + 1)$

6. $y' + \dfrac{y}{x} = \dfrac{\mathrm{e}^{5x}}{x}\,,\ \ y(1) = 1$

7. $y' = \dfrac{y}{x} + \dfrac{3x^3 - 2x^2}{2y}\mathrm{e}^{4x}$

8. $\left(\dfrac{1}{x} + x\mathrm{e}^y\right) dy = \left(\dfrac{y}{x^2} - \mathrm{e}^y\right) dx\,,\ \ y(1) = 2$

9. $(\mathrm{e}^{x-y}(1 - y) + x)dy + (y\mathrm{e}^{x-y} + y)dx = 0\,,\ \ y(1) = 1$

10. $\left(2\cos(x - 2y) + \dfrac{1}{y^2}\right) dy = \cos(x - 2y)dx\,,\ \ y(2) = 1$

11. $y'' + 16y = 3x - 2$

12. $y'' - 4y' + 4y = \mathrm{e}^{2x}\,,\quad y(0) = \mathrm{e}\,,\ \ y'(0) = 0$

Контрольная работа 1
Вариант 9

1. $y' + 3x^2y = 3x^2y^{2/3}\,,\ \ y(2) = 8$

2. $y' - y\,\mathrm{tg}\,x = \dfrac{1}{\cos x}\,,\ \ y(0) = 0$

3. $y' + 3x^2y = (5x - 4)\mathrm{e}^{x(3-x^2)}$

4. $\mathrm{e}^{-y}dx + (1 - x\mathrm{e}^{-y})dy = 0$

5. $y' = 2\sqrt{y}\ln x\,,\ \ y(\mathrm{e}) = 1$

6. $x(4+y^2)dx = (9+x^2)dy$

7. $y^2\cos y dy + y\sqrt{x}\,dx = 0$

8. $y' = \dfrac{y\sin x - \sin y}{\cos x + x\cos y}\,,\ \ y(\pi) = \pi$

9. $(y\mathrm{e}^x - \mathrm{e}^y)dx + (\mathrm{e}^x - x\mathrm{e}^y)dy = 0$

10. $x\sqrt{y}\cdot y' - 3\ln^2 x = 0\,,\ \ y(1) = 1$

11. $y'' - 2y' + 17y = \mathrm{e}^x$

12. $y'' + 6y' + 9y = \mathrm{e}^{-3x}\,,\quad y(0) = 0\,,\ \ y'(0) = 0$

Контрольная работа 1
Вариант 10

1. $y' + y\cos x = \dfrac{1}{2}\sin 2x$

2. $y' + \dfrac{y}{x} = \dfrac{\mathrm{tg}(x+2)}{x}$

3. $y^2(1-x) - y'x(1+y^2) = 0$

4. $\mathrm{e}^{2x-3y}dx + \mathrm{e}^{-4x-y}dy = 0\,,\ \ y(0) = 0$

5. $y' = \dfrac{3x-4}{y+1}\mathrm{e}^{y-3x}\,,\ \ y(1) = 0$

6. $y' = y - \mathrm{e}^{3x}\dfrac{3x+1}{4y^3}$

7. $y' + 2xy = 4x\mathrm{e}^{-x^2+2x}\,,\ \ y(0) = 0$

8. $(3+\mathrm{e}^x)y\sqrt{y}\cdot y' = \mathrm{e}^x$

9. $\left(\dfrac{1}{y^2} - x^2\cos y\right)dy = 2x\sin y\,dx\,,\ \ y(1) = \pi$

10. $\left(\dfrac{x}{y} - x\right)dy + (\ln y - y)dx = 0$

11. $y'' + 2y' + 17y = \mathrm{e}^{-x}$

12. $y'' - 6y' + 9y = \mathrm{e}^{3x}\,,\quad y(0) = 0\,,\ \ y'(0) = 0$

Контрольная работа 1
Вариант 11

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

2. $\left(\dfrac{x}{y^2} + \dfrac{x}{y}\right) dy = \left(\dfrac{1}{y} - \ln y\right) dx$

3. $y' = \dfrac{1}{x^2 \ln y}\,,\ \ y(1) = 2$

4. $y' + 3x^2 y = \mathrm{e}^{x - x^3}(2x - 5)$

5. $y' = \dfrac{1}{y^3(4x^2 + 1)}\,,\ \ y(0) = 1$

6. $\dfrac{3dy}{x - 3y} = \left(\dfrac{x^3}{2\sqrt{x^4 - 2}} + \dfrac{1}{x - 3y}\right) dx$

7. $y' + \dfrac{2y}{3x^2} = \dfrac{x}{y^2}\mathrm{e}^{x + 2/x}\,,\ \ y(1) = 0$

8. $y' = \dfrac{\operatorname{tg} x}{\cos y}$

9. $y' = \dfrac{y \sin x - 2xy - \sin y}{x^2 + x\cos y + \cos x}\,,\ \ y(0) = 0$

10. $(x^2 + 4)y' = 3y + 2$

11. $y'' - 8y' + 17y = x\mathrm{e}^{2x}$

12. $y'' - 7y' = \mathrm{e}^{7x}\,,\quad y(0) = 1\,,\ \ y'(0) = 1$

Контрольная работа 1
Вариант 12

1. $y' = \dfrac{2y^2 + y\cos x + \cos y}{x\sin y - \sin x - 4xy}\,,\ \ y(\pi) = \pi$

2. $y' = 4x^3 y + \mathrm{e}^{x^4} \operatorname{tg} 3x$

3. $y' \cos^2 x = \operatorname{tg} y\,,\ \ y(0) = \pi/2$

4. $\dfrac{y'}{\cos x} = \dfrac{\sin x}{\cos y}$

5. $y' + \dfrac{5y}{x^2} = \dfrac{\mathrm{e}^{5/x}}{x^2 - 2}\,,\ \ y(1) = 1$

6. $\left(\sqrt{x} + \dfrac{x^2}{y}\right) dy + \left(\dfrac{y}{2\sqrt{x}} + 2x\ln y\right) dx = 0$

$$7.\ \frac{y'}{y^2-4}=\frac{1}{y(x-3)}\,,\ \ y(4)=1$$

$$8.\ y'=\frac{y}{x}+\frac{3x^4+x^3}{3y^2}\mathrm{e}^{x+2}$$

$$9.\ \frac{dy}{2x-y}=\left(\frac{x^2}{2\sqrt{x^3+3}}+\frac{2}{2x-y}\right)dx\,,\ \ y(0)=1$$

$$10.\ \frac{y'}{\sin x}=\frac{y^3}{\cos x}$$

$$11.\quad y''+8y'+17y=x\mathrm{e}^x$$

$$12.\quad y''-6y'+8y=7\,,\quad y(0)=0\,,\ \ y'(0)=0$$

Контрольная работа 1
Вариант 13

$$1.\ y'=-\frac{6x(x^2+y)+2\mathrm{e}^{2x+y}}{3(x^2+y)+\mathrm{e}^{2x+y}}\,,\ \ y(0)=0$$

$$2.\ \mathrm{e}^y\cdot y'=\frac{\mathrm{e}^y+2}{\cos^2 x}$$

$$3.\ y'+\frac{2y}{x^2}=\frac{\mathrm{e}^{2/x}}{\sqrt{x^2+4}}\,,\ \ y(1)=1$$

$$4.\ y'\operatorname{tg}x=\frac{1}{\sin 2y}$$

$$5.\ y'=\frac{y\sin x}{\cos x+3/(y^2)}\,,\ \ y(\pi)=1$$

$$6.\ y'=\frac{4y}{x}+(2x^5+x^4)\sin(x+2)$$

$$7.\ \frac{y'}{\mathrm{e}^x+1}=\frac{\mathrm{e}^x}{\sqrt{y}}\,,\ \ y(1)=1$$

$$8.\ \mathrm{e}^{x-2y}+\mathrm{e}^{2x+y}\cdot y'=0$$

$$9.\ y'+x^3y=\frac{\mathrm{e}^{-x^4}}{4y^3}\operatorname{ctg}4x\,,\ \ y(\pi/8)=0$$

$$10.\ y'=-\frac{2xy^3+2x\mathrm{e}^y+\mathrm{e}^x}{3x^2y^2+x^2\mathrm{e}^y}$$

$$11.\quad y''-4y'+8y=\mathrm{e}^{-4x}$$

$$12.\quad y''+8y'+15y=7\,,\quad y(0)=0\,,\ \ y'(0)=0$$

Контрольная работа 1
Вариант 14

1. $\mathrm{e}^{x-y}dy = \left(\dfrac{x^2}{1+x^6} + \mathrm{e}^{x-y}\right)dx\,,\ \ y(1) = 1$

2. $xy' = \sqrt{y}\ln^2 x\,,\ \ y(\mathrm{e}) = 1$

3. $y' = -\dfrac{3x^2y^2 + \mathrm{e}^y + y\mathrm{e}^x}{\mathrm{e}^x + x\mathrm{e}^y + 2x^3y}$

4. $y' = \dfrac{5y}{x} + x^6\cos(2x-1)$

5. $\dfrac{y'}{\operatorname{ctg} x} = \sin^2 y\,,\ \ y(\pi/2) = \pi/2$

6. $\dfrac{y'}{x\sqrt{y}} = \sin x\,,\ \ y(0) = 1$

7. $y' + xy = 2x\mathrm{e}^{x-x^2/2}$

8. $y' = -\dfrac{\sqrt{y} + \dfrac{y}{x}}{\dfrac{x}{2\sqrt{y}} + \ln x}$

9. $3y'\sqrt{x} = y^2\,,\ \ y(4) = 1$

10. $y' + \dfrac{5y}{x^2} = 10(x-1)\mathrm{e}^{3x+1/x}y^{4/5}$

11. $y'' + 4y' + 8y = x\mathrm{e}^{2x}$

12. $y'' - 8y' + 12y = \mathrm{e}^{2x}\,,\quad y(0) = 1\,,\ \ y'(0) = 0$

Контрольная работа 1
Вариант 15

1. $y' = \dfrac{4y}{x^2} + \mathrm{e}^{2x-4/x}\,,\ \ y(1) = 1$

2. $y'\operatorname{ctg} x = \cos^2 y$

3. $2\sin(x+2y)dy = \left(\dfrac{x}{\sqrt{1-x^4}} - \sin(x+2y)\right)dx\,,\ \ y(0) = \pi/4$

4. $y' = \dfrac{2/(x^2) + \cos y}{x\sin y}$

5. $y' + xy = \dfrac{x\mathrm{e}^{-x^2}}{2(x^2+5)y}\,,\ \ y(0) = 1$

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

7. $y' = \dfrac{y+3}{y\sqrt{x}}\,,\ \ y(1) = 2$

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

9. $y' = \dfrac{y\sin x - 2x\sin y}{3y^2 + \cos x + x^2\cos y}\,,\ \ y(\pi) = \pi$

10. $(4+x^2)y' = \dfrac{y^2-1}{y}$

11. $y'' - 6y' + 18y = 5$

12. $y'' + 2y' - 8y = \mathrm{e}^x\,,\quad y(0) = 0\,,\ \ y'(0) = 0$

Контрольная работа 1
Вариант 16

1. $\cos(2x+y)dy + \left(\dfrac{x}{\sqrt{1-x^4}} + 2\cos(2x+y)\right)dx = 0$

2. $y' = 2xy + \mathrm{e}^{x^2}\sin^2 x\cos x\,,\ \ y(0) = 1$

3. $\operatorname{tg} y + \sqrt{y} + \left(\dfrac{x}{2\sqrt{y}} + \dfrac{x}{\cos^2 y}\right)y' = 0$

4. $\dfrac{y'}{\operatorname{tg} x} = \dfrac{1}{\cos^2 y}\,,\ \ y(0) = \pi$

5. $y' = \dfrac{y\mathrm{e}^{2x+5}}{\ln y}$

6. $y' = \dfrac{y}{x} + \dfrac{x^2\ln^2 x}{3y^2}\,,\ \ y(1) = 1$

7. $y(x^2+4)y' = y^2 + 7$

8. $(4+x^2)y' = x(y^2+9)\,,\ \ y(0) = 0$

9. $y' = \dfrac{5y}{x^2} + \dfrac{1}{\mathrm{e}^{5/x}(4x^2+1)}$

10. $y' = \dfrac{3x^2\cos y + y\cos x + x^3 y}{x^3\sin y - x^4/4 - \sin x}\,,\ \ y(0) = \pi/2$

11. $y'' + 6y' + 18y = x$

12. $y'' + 4y' - 5y = \mathrm{e}^x\,,\quad y(0) = 0\,,\ \ y'(0) = 1$

Контрольная работа 1
Вариант 17

1. $y' = \dfrac{y}{\sqrt{2+x}}\,,\ \ y(0) = 1$

2. $(\operatorname{ctg} x + \sqrt{x})y' + \dfrac{y}{2\sqrt{x}} = \dfrac{y}{\sin^2 x}$

3. $y' = \dfrac{4y}{x} + x^3 \ln x\,,\ \ y(1) = 0$

4. $3\cos(x+3y)dy = \left(\dfrac{x^2}{x^3+2} - \cos(x+3y)\right)dx$

5. $y' = (2x+3)\mathrm{e}^{x+2y}\,,\ \ y(0) = 0$

6. $y' = -\dfrac{y^3\cos x + \cos y + y^3/3}{xy^2 - x\sin y + 3y^2\sin x}\,,\ \ y(\pi) = \pi/2$

7. $y' = \dfrac{3y}{x^2} + \dfrac{1}{\mathrm{e}^{3/x}\sqrt{4-x^2}}$

8. $y' \operatorname{tg} x = \sin^2 y$

9. $x^3y' - 3y\sqrt{y} = 0$

10. $y' = \dfrac{x^2y}{2} + \dfrac{\mathrm{e}^{x^3}\sin 2x\cos x}{6y^5}\,,\ \ y(0) = 1$

11. $y'' - 4y' + 20y = \mathrm{e}^{2x}$

12. $y'' - 10y' + 25y = \mathrm{e}^{5x}\,,\quad y(0) = 1\,,\ \ y'(0) = 1$

Контрольная работа 1
Вариант 18

1. $y' + x^3y = \dfrac{\ln^2 x}{4xy^3\mathrm{e}^{x^4}}\,,\ \ y(1) = 1$

2. $y'(x^2-9) = 2 - 7y$

3. $\cos(2x+y)y' + \dfrac{x}{x^2+1} + 2\cos(2x+y) = 0$

4. $y' = \dfrac{y}{x^2} + \dfrac{1}{\mathrm{e}^{1/x}(6x-5)}\,,\ \ y(2) = 0$

5. $\dfrac{y'}{\cos x} = \dfrac{x}{y\sqrt{y}}$

6. $yy' = \mathrm{e}^{x-3y}\,,\ \ y(0) = 0$

7. $y' = \dfrac{x}{\sqrt{3+y}}$

8. $y' = \dfrac{2y}{x} + x^2 \sin^2 x \cos x\,,\ \ y(\pi) = 0$

9. $y' = -\dfrac{y^5 \mathrm{e}^x + \ln y + y^4}{4y^3 x + x/y + 5\mathrm{e}^x y^4}\,,\ \ y(1) = 1$

10. $\left(\dfrac{1}{x} - \dfrac{x}{y}\right) dy = \left(\dfrac{y}{x^2} + \ln y\right) dx$

11. $y'' + 4y' + 20y = \mathrm{e}^{-2x}$

12. $y'' - 2y' - 15y = 9\,,\quad y(0) = 1\,,\ \ y'(0) = 0$

Контрольная работа 1
Вариант 19

1. $(x^3 + x^5 \mathrm{e}^y + y \ln(x^2))y' + y^2/x + 5x^4 \mathrm{e}^y + 3x^2 y = 0$

2. $y' = \dfrac{6y}{x^2} + \dfrac{6y^{5/6}}{\mathrm{e}^{1/x}\sqrt{x^2+1}}\,,\ \ y(1) = 0$

3. $y' = \dfrac{\mathrm{e}^{2x-y}}{y}\,,\ \ y(2) = 1$

4. $y' = \dfrac{x}{y^3(x^2-9)}$

5. $y' = xy + \mathrm{e}^{x^2/2}(2x^2\sqrt{x} + 1/x)\,,\ \ y(2) = 0$

6. $\left(\sin(x-y) + \dfrac{2y}{y^4+1}\right) dy = \sin(x-y)dx$

7. $y' = \dfrac{\sqrt{y+1}}{x}\,,\ \ y(1) = 3$

8. $\dfrac{\cos x}{y} + \sqrt{y} + y'\left(\dfrac{x}{2\sqrt{y}} - \dfrac{\sin x}{y^2}\right) = 0$

9. $y' = \dfrac{3y}{x} + \dfrac{2x^4 + x^3}{x^2+1}$

10. $\dfrac{y'}{x} = \sqrt{x}(y^2 + 2y)\,,\ \ y(1) = 1$

11. $y'' - 8y' + 20y = \mathrm{e}^{4x}$

12. $y'' + 7y' - 8y = x\mathrm{e}^{-8x}\,,\quad y(0) = 0\,,\ \ y'(0) = 0$

Контрольная работа 1
Вариант 20

1. $2y^5(x^2-9)y' = 1\,,\ \ y(2) = 1$

2. $\left(\sqrt{y} - \dfrac{\sin y}{x}\right) dy = \left(\dfrac{\cos y}{x^2} - \dfrac{1}{2\sqrt{x}}\right) dx$

3. $y' = 2xy + \mathrm{e}^{x^2+3x}\,,\ \ y(0) = 0$

4. $(x^2+2x)y' = 2y + 7$

5. $\dfrac{2x}{1+x^4} + \cos(x+y) + y'\cos(x+y) = 0$

6. $y' = \dfrac{y}{x} + \dfrac{x^4}{4y^3(2x+3)^3}\,,\ \ y(-1) = 1$

7. $y' = \dfrac{\sqrt{5-x}}{y}$

8. $y' = \dfrac{(2x-1)\mathrm{e}^{-y}}{y}\,,\ \ y(0) = 0$

9. $y' = \dfrac{2xy + \ln y - 2x\sin y}{x^2\cos y - x^2 - x/y}$

10. $y' = \dfrac{y}{x^2} + \mathrm{e}^{-1/x}\cdot 2^{3x+1}\,,\ \ y(1) = 0$

11. $y'' + 8y' + 20y = x\mathrm{e}^x$

12. $y'' + 6y' + 9y = x\,,\quad y(1) = \mathrm{e}^3\,,\ \ y'(1) = 0$