

51. $xy dx + (x + 1) dy = 0$.

52. $\sqrt{y^2 + 1} dx = xy dy$.

53. $(x^2 - 1)y' + 2xy^2 = 0$; $y(0) = 1$.

54. $y' \operatorname{ctg} x + y = 2$; $y(x) \rightarrow -1$ при $x \rightarrow 0$.

55. $y' = 3\sqrt[3]{y^2}$; $y(2) = 0$.

56. $xy' + y = y^2$; $y(1) = 0,5$.

57. $2x^2yy' + y^2 = 2$.

58. $y' - xy^2 = 2xy$.

59. $e^{-s} \left(1 + \frac{ds}{dt}\right) = 1$.

60. $z' = 10^{x+z}$.

61. $x \frac{dx}{dt} + t = 1$.

62. $y' = \cos(y - x)$.

101. $(x + 2y) dx - x dy = 0$.

102. $(x - y) dx + (x + y) dy = 0$.

103. $(y^2 - 2xy) dx + x^2 dy = 0$.

104. $2x^3y' = y(2x^2 - y^2)$.

105. $y^2 + x^2y' = xy y'$.

106. $(x^2 + y^2)y' = 2xy$.

Дифференциалдық теңдеулерді шешіңіз:

1. $\frac{d^2y}{dx^2} - 4y = 0$.

2. $\frac{d^2u}{dt^2} - 3\frac{du}{dt} - 4u = 0$.

3. $\frac{d^2y}{dx^2} + 3\frac{dy}{dx} + 6y = 0$.

4. $\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + 8y = 0$.

5. (a) $y'' + 4y' + 13y = 0$ жалпы шешімін табыңыз.

(b) Дербес шешімін табыңыз:

$$y'' + 4y' + 13y = 0, \quad y(0) = 2, \quad y'(0) = -3.$$

136. $xy' - 2y = 2x^4$.

137. $(2x + 1)y' = 4x + 2y$.

138. $y' + y \operatorname{tg} x = \sec x$.

139. $(xy + e^x) dx - x dy = 0$.

140. $x^2 y' + xy + 1 = 0$.

141. $y = x(y' - x \cos x)$.

142. $2x(x^2 + y) dx = dy$.

511. $y'' + y' - 2y = 0$. 512. $y'' + 4y' + 3y = 0$.

513. $y'' - 2y' = 0$. 514. $2y'' - 5y' + 2y = 0$.

515. $y'' - 4y' + 5y = 0$. 516. $y'' + 2y' + 10y = 0$.

$+xy'^2 = -1$. 51. $y = C(x+1)e^{-x}$; $x = -1$. 52. $\ln|x| = C + \sqrt{y^2 + 1}$; $x = 0$.
53. $y(\ln|x^2 - 1| + C) = 1$, $y = 0$; $y[\ln(1 - x^2) + 1] = 1$. 54. $y = 2 + C \cos x$;
 $y = 2 - 3 \cos x$. 55. $y = (x - C)^3$; $y = 0$; $y = (x - 2)^3$; $y = 0$. 56. $y(1 - Cx) =$
 $= 1$; $y = 0$; $y(1 + x) = 1$. 57. $y^2 - 2 = Ce^{1/x}$. 58. $(Ce^{-x^2} - 1)y = 2$; $y = 0$.
59. $e^{-s} = 1 + Ce^t$. 60. $z = -\lg(C - 10^x)$. 61. $x^2 + t^2 - 2t = C$.

скорость ракеты $v(x) = c \ln \frac{M}{M-x}$; $v(M-m) = c \ln \frac{M}{m}$. 101. $x + y =$
 $= Cx^2$; $x = 0$. 102. $\ln(x^2 + y^2) = C - 2 \operatorname{arctg}(y/x)$. 103. $x(y-x) = Cy$;
 $y = 0$. 104. $x = \pm y\sqrt{\ln Cx}$; $y = 0$. 105. $y = Ce^{y/x}$. 106. $y^2 - x^2 = Cy$;

136. $y = Cx^2 + x^4$. 137. $y = (2x+1)(C + \ln|2x+1|) + 1$. 138. $y = \sin x +$
 $+ C \cos x$. 139. $y = e^x(\ln|x| + C)$; $x = 0$. 140. $xy = C - \ln|x|$. 141. $y =$
 $= x(C + \sin x)$. 142. $y = Ce^{x^2} - x^2 - 1$. 143. $y = C \ln^2 x - \ln x$. 144. $xy =$

511. $y = C_1 e^x + C_2 e^{-2x}$. 512. $y = C_1 e^{-x} + C_2 e^{-3x}$. 513. $y = C_1 + C_2 e^{2x}$.
514. $y = C_1 e^{2x} + C_2 e^{x/2}$. 515. $y = e^{2x}(C_1 \cos x + C_2 \sin x)$. 516. $y =$
 $= e^{-x}(C_1 \cos 3x + C_2 \sin 3x)$. 517. $y = C_1 \cos 2x + C_2 \sin 2x$. 518. $y =$