

(1-16) Denklemleri çözünüz:

1. $xy'' + xy'^2 + y' = 0, x \neq 0.$
2. $y''^3 + y'^5 = (y'' + y')y''y'^2.$
3. $y'' = \frac{y'}{x} \ln \frac{y'}{x} + \frac{y'}{x}.$
4. $4y''\sqrt{y} = 1.$
5. $yy'' - y'^2 = y'y^2.$
6. $3yy'y'' = y'^3 + 2.$
7. $5yy'^3y'' = y'^5 + 4.$
8. $yy'' = 7y'^2 + y^4y'.$
9. $yy'' = 2y'^2 - 4y^2y'^3.$
10. $(y^3 + y)y'' - (3y^2 - 1)y'^2 = 0.$
11. $yy''' - y'y'' = 0.$
12. $yy'' = 2y' + 2y'^2.$
13. $(1 + y^2)y'' + 2yy'^2 = y'.$
14. $(1 + y^2)y'' = y(y'^2 - 1).$
15. $4xy'' - y''^2 = 4(y' + 1).$
16. $2(1 - y)y'' = y'^2 + 1.$
17. $2yy'y'' - y''^2 = y'^3.$

(18-38) Denklemlerin başlangıç değer şartlarını sağlayan çözümünü bulunuz:

18. $y'' \sin^3 x - (y' \sin^2 x + y'^2) \cos x = 0, y\left(\frac{\pi}{2}\right) = 0, y'\left(\frac{\pi}{2}\right) = 1.$
19. $y'' \cos^3 x + (y' \cos^2 x + y'^2) \sin x = 0, y(0) = 0, y'(0) = 1.$
20. $(x+1)y^{(n)} = y^{(n-1)}, n \geq 2, y^{(n-2-k)}(0) = (n-2-k)!, k = 0, 1, \dots, n-2, y^{(n-1)}(0) = 0.$
21. $xy^{(n)} = y^{(n-1)}, n \geq 2, y^{(n-2-k)}(0) = (n-2-k)!, k = 0, 1, \dots, n-2, y^{(n-1)}(0) = 0.$
22. $y'' = 5y\sqrt{y}, y(0) = 1, y'(0) = -2.$
23. $y'' = y'^2 + (1 - y)y', y(1) = y'(1) = 1.$
24. $y'' + y'^2 = y'e^y, y(0) = 0, y'(0) = \frac{1}{2}.$
25. $yy'' - y'^2 + 2 = 0, y(0) = 1, y'(0) = 0.$
26. $yy'' = y^2y'^3 + y'^2, y(0) = 1, y'(0) = -3.$
27. $3y'y'' = e^y, y(-3) = 0, y'(-3) = 1.$
28. $2yy'' = y'^2(3 - 4yy'^2), y(4) = 1, y'(4) = -1.$
29. $yy'' - y'^2 = y^4, y(1) = 2, y'(1) = -4.$
30. $yy'' = 5y'^2 + 3y^2y', y(1) = 1, y'(1) = -1.$
31. $yy'' = (4y'^4 - y'^2)e^y, y(0) = 1, y'(0) = -\frac{1}{2}.$
32. $2y^2y'' = 2y'^4 - yy'^2, y(1) = y'(1) = 1.$
33. $2y^2y'' + y'^2 = 4, y(0) = 1, y'(0) = -2.$
34. $3y'y'' - y'^3 - y + 2 = 0, y(0) = 0, y'(0) = 1.$
35. $2(y^2 + y)y'' - (y^2 + y + 1)y'^2 + y^3 = 0, y(2) = 1, y'(2) = -1.$

(39-53) Denklemleri çözünüz:

39. $xyy'' - (x+1)yy' = xy'^2, x \neq 0.$

40. $yy'' - y'^2 + y^2 \sin x = 0.$

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

42. $xyy'' + yy' = xy'^2 + y^2, x \neq 0.$

43. $y^2y''' - 3yy'y'' + 2y'^3 + y^3 \sin x = 0.$

44. $x^2yy'' = (xy' + y)^2, x \neq 0.$

45. $xyy'' - yy' = 2xy'^2, x \neq 0.$

46. $yy'' + yy' \operatorname{tg} x + 2y'^2 = 0.$

47. $yy'' + yy' \operatorname{tg} x = 2y'^2.$

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

49. $xyy'' + 2xy'^2 = 2yy', x \neq 0.$

50. $xyy'' + xy'^2 + yy' = 0, x \neq 0.$

51. $y^2y'' - yy' \left(y' + \frac{y}{x} \right) + \frac{4}{x}y'^3 = 0.$

52. $yy'y'' - \frac{yy'^2}{x} - y'^3 = x^3y^3.$

53. $(x+1)yy'' + yy' = xy'^2, x \neq -1.$

(54-67) Denklemlerin başlangıç değer şartlarını sağlayan çözümünü bulunuz:

54. $yy'' = (1-x)y'^2, y(1) = 1, y'(1) = 2.$

55. $(yy'' - y'^2) \sin x + y^2 = (\sin x - \cos x)yy', y\left(\frac{\pi}{2}\right) = y'\left(\frac{\pi}{2}\right) = 1.$

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

57. $4xyy'' - 4yy' + y'^2 = 0, y(-1) = 1, y'(-1) = -4.$

58. $xyy'' - 4xy'^2 + 4yy' = 0, y(1) = 1, y'(1) = 2.$

59. $2xy^2y'' - 2xyy'^2 + 2xy'^3 = y'y^2, y(1) = y'(1) = -1.$

60. $(1 - \sin x)yy'' + yy' \cos x = y'^2, y(0) = 2, y'(0) = 1.$

61. $y^2(y'' - y') = y'^2(y - 2xy'), y(1) = y'(1) = e.$

62. $xyy'' + x(2 \ln x - 1)y'^2 = yy', y(1) = 1, y'(1) = -2.$

63. $xyy'' + (1 + x^2)yy' + xy^2 = xy'^2, y(1) = 1, y'(1) = -1.$

64. $y^2y'' - \frac{3}{2}x^2y^2y' + \frac{3}{8}x^2y'^3 - yy'^2 = 0, y(1) = 1, y'(1) = -2.$

65. $x^2y'' + 2x^2yy' + 2xy^2 - 2y = 0, a) y(1) = 2, y'(1) = 0, 6) y(1) = -1, y'(1) = 1.$

66. $x^4y'' - xyy' + 2(y - x^2)y = 0, y(1) = 1, y'(1) = \frac{1}{2}.$

67. $x^4y'' - x^2yy'^2 + 2xy'y^2 = y^3, y(2) = 2, y'(2) = 1.$

Cevaplar:

1. $e^y = C_1 \ln(C_2 x), y = C.$
2. $e^y(x + C_1) = C_2, (y + C_1)(C_2 - x) = 4, y = C.$
3. $2y = x^2 + C, yC_1^2 = e^{C_1 x}(C_1 x - 1) + C_2.$
4. $4(\sqrt{y} + C_1)^{\frac{3}{2}} - 12C_1(\sqrt{y} + C_1)^{\frac{1}{2}} = C_2 \pm 3x.$
5. $y(1 + C_2 e^{C_1 x}) = C_1, y(C - x) = 1.$
6. $yC_1 = \left(\frac{2}{3}C_1 x + C_2\right)^{\frac{3}{2}} + 2, y = C - x\sqrt[3]{2}.$
7. $yC_1 = \left(\frac{4}{5}C_1 x + C_2\right)^{\frac{5}{4}} + 4, y = C - x\sqrt[5]{4}.$
8. $y^3 \left[1 + C_2 e^{C_1 \left(x - \frac{1}{y^3}\right)}\right] = C_1.$
9. $y^4 + C_1 = y(3x + C_2), y = C.$
10. $(1 + y^2)(C_1 x + C_2) = 1.$
11. $y + \sqrt{y^2 + C_1} = C_2 e^{C_3 x}, y = C_1 \sin(C_2 x + C_3), y = C_1 x + C_2.$
12. $y \left(1 - C_2 e^{\frac{2x}{C_1}}\right) = C_1 \left(1 + C_2 e^{\frac{2x}{C_1}}\right), \arctg(C_1 y) + C_1 x = C_2, y + x = C.$
13. $(y - C_1)^2 + (C_1^2 + 1) \ln(y + C_1)^2 = 2x + C_2, y = C.$
14. $y + \sqrt{1 + y^2 + C_1^2} = C_2 e^{\frac{x}{C_1}}, y = \sqrt{C_1^2 - 1} \sin\left(\frac{x}{C_1} + C_2\right), y = \pm x + C.$
15. $y = C_1 x^2 - C_1^2 x - x + C_2, 3y = x^3 - 3x + C.$
16. $2x = C_1(2t + \sin 2t) + C_2, y = 1 - C_1 \cos^2 t.$
17. $2y = C_2 e^{C_1 x} + C_1, y(x + C) + 2 = 0.$
18. $4y = 2x - \pi - \sin 2x.$
19. $4y = 2x + \sin 2x.$
20. $y = x^{n-2} + x^{n-3} + \dots + 1.$
21. $y = Cx^n + x^{n-2} + x^{n-3} + \dots + 1.$
22. $y(x + 2)^4 = 16.$
23. $y = e^{x-1}.$
24. $(2 - x)e^y = 2.$
25. $y = \cos(x\sqrt{2}).$
26. $y = \sqrt[3]{1 - 9x}.$
27. $x^3 e^y + 27 = 0.$
28. $y = \left(7 - \frac{3}{2}x\right)^{\frac{2}{3}}.$
29. $y(2x - 1) = 2.$
30. $xy = 1.$
31. $2y = 2 - x.$
32. $4y = (x + 1)^2.$
33. $y = 1 - 2x.$
34. $y = 1 - \left(1 - \frac{2}{3}x\right)^{\frac{3}{2}}.$
35. $4y = (x - 4)^2.$
36. $y + e^y = x.$
37. $y = \sqrt{x + 1}.$
38. $\ln y = \sqrt{2x + 1}.$
39. $\ln(C_2 y) = C_1(x - 1)e^x, y = 0.$
40. $\ln(C_2 y) = C_1 x + \sin x, y = 0.$
41. $y = C_1 |x|^{C_2}.$
42. $y = C_1 e^x |x|^{C_2}.$
43. $\ln(C_3 y) = C_2 x^2 + C_1 x - \cos x, y = 0.$
44. $\ln(C_2 y \sqrt[3]{x}) = C_1 x^3, y = 0$
45. $y(C_1 + C_2 x^2) = 1, y = 0.$
46. $y = \sqrt[3]{C_1 + C_2 \sin x}.$
47. $y(C_1 + C_2 \sin x) = 1, y = 0.$
48. $y[C_1 + C_2(x + 1)^2] = 1, y = 0.$
49. $y = \sqrt[3]{C_1 x^3 + C_2}.$
50. $y^2 = C_1 \ln|x| + C_2.$
51. $\ln(C_2 y^2) = \pm \sqrt{x^2 + C_1}, y = C.$
52. $\ln(C_2 y^3) = \pm (x^2 + C_1)^{\frac{3}{2}}, y = 0.$

53. $y|C_1x + C_1 + 1|^{\frac{1}{C_1}} = C_2, y = Ce^{-x}, y = C.$ 54. $x \ln y = 2(x - 1).$
 55. $y = \operatorname{tg} \frac{x}{2}.$ 56. $\ln y = 1 - x.$
 57. $y = (2x + 1)^2.$ 58. $y\sqrt[3]{2 - x^3} = x.$
 59. $\ln(-y) = 2(\sqrt{x} - 1).$ 60. $\ln y = \ln(1 + \cos x) + \operatorname{tg} \frac{x}{2}.$
 61. $\ln y = \sqrt{2x - 1}.$ 62. $y = 1 - 2 \ln x.$
 63. $xy = 1.$ 64. $\ln y = 2(1 - x).$
 65. a) $y(1 + 2x^3) = 6x^2, 6) xy + 1 = 0.$ 66. $y(1 + 5x^3) = 6x^2.$
 67. $y = x.$

(1-38) Lineer homojen diferansiyel denklemleri çözünüz:

1. $y'' - 4y' + 3y = 0.$
2. $y'' - 6y' + 8y = 0.$
3. $y'' + 3y' + 2y = 0.$
4. $y'' - y' - 2y = 0.$
5. $y'' + 5y' + 6y = 0.$
6. $y'' - 4y' + 8y = 0.$
7. $y'' - 6y' + 18y = 0.$
8. $y'' - 2y' + 10y = 0.$
9. $y'' + 2y' + 5y = 0.$
10. $y'' + 2y' + 2y = 0.$
11. $y'' - 4y' + 4y = 0.$
12. $y'' - 6y' + 9y = 0.$
13. $y'' - 8y' + 16y = 0.$
14. $y''' + 4y'' - y' - 4y = 0.$
15. $y''' + 3y'' - y' - 3y = 0.$
16. $y''' - 7y'' + 14y' - 8y = 0.$
17. $y''' + 4y'' + 5y' + 2y = 0.$
18. $y''' + 3y'' - 4y = 0.$
19. $y''' - 3y'' + 7y' - 5y = 0.$
20. $y''' + y'' + 4y' + 4y = 0.$
21. $y''' + 3y'' + 4y' + 2y = 0.$
22. $y''' - y'' + y' - y = 0.$
23. $y^{IV} - y''' + 2y' = 0.$
24. $y^{IV} - 7y''' + 14y'' - 8y' = 0.$
25. $y^{IV} - 5y''' + 7y'' - 3y' = 0.$
26. $y^{IV} - 6y''' + 9y'' + 4y' - 12y = 0.$
27. $y^{IV} + 5y''' + 9y'' + 7y' + 2y = 0.$
28. $y^{IV} + 2y''' + 2y'' + 2y' + y = 0.$
29. $y^{IV} - 2y''' + 2y'' - 2y' + y = 0.$
30. $y^{IV} - 2y'' + y = 0.$
31. $y^{IV} + 6y''' + 12y'' + 8y' = 0.$
32. $y^{IV} + 2y''' - 2y'' + 2y' - 3y = 0.$
33. $y^{IV} - 5y''' + 5y'' + 5y' - 6y = 0.$
34. $y^{IV} + 5y'' + 4y = 0.$
35. $y^{IV} + 8y'' + 16y = 0.$
36. $y^{IV} + 3y'' + 2y = 0.$
37. $y^{IV} + 18y'' + 81y = 0.$
38. $y''' + 3y'' + 3y' + y = 0.$

(39-122) Lineer homojen olmayan diferansiyel denklemleri çözünüz:

39. $y'' - 3y' + 2y = (1+x)e^{2x}$. 40. $y'' + 2y' + y = x^2e^{-x}$.
 41. $y'' - y' - 2y = -9xe^{-x}$. 42. $y'' + y' - 6y = -18x^2e^{-x}$.
 43. $y'' - y = e^x \cos x$. 44. $y'' - y' + \frac{1}{2}y = e^x \sin x$.
 45. $y'' - 4y' + 4y = x^2 + 2e^{2x}$. 46. $y'' + y' - 2y = 2xe^{-2x} + 5 \sin x$.
 47. $y'' + 4y = 4xe^{-2x} - \sin 2x$. 48. $y'' + 2y' - 3y = 2 \cos x - 8xe^{-3x}$.
 49. $y'' + 9y = 6xe^{-3x} - 3 \cos 3x$. 50. $y'' + 6y' + 9y = 36xe^{3x}$.
 51. $y'' - 4y' + 4y = 32xe^{-2x}$. 52. $y'' + y' = (5-2x)e^{-x} - 10 \sin 2x$.
 53. $y'' - y' = (4x+3)e^x - 2 \cos x$. 54. $y'' - 4y' = -8e^{2x} \cos 2x - 8x + 2$.
 55. $y'' - 4y' + 13y = -9 \cos 2x - 8 \sin 2x$. 56. $y'' + 4y' + 4y = 2e^{-2x}$.
 57. $y'' - 2y' + 5y = 4 \cos x + 2 \sin x$.
 58. $y'' - 8y' + 20y = -2e^{3x}(2 \cos x + \sin x)$. 59. $y'' + y' - 6y = -5e^{-3x}$.
 60. $y'' - 2y' + y = 2e^x$. 61. $y'' - 7y' + 12y = -e^{3x}$.
 62. $y'' - 2y' + 3y = 4 \cos x - 2 \sin x + 4e^{3x}$. 63. $y'' + 2y' - 3y = (2-8x)e^{-3x}$.
 64. $y'' - y' - 12y = e^{-2x}(7 \cos x - 5 \sin x) - 7e^{-3x}$.
 65. $y'' + 4y = 2 \cos 2x - 8x \sin 2x$. 66. $y'' + 4y = 2 \cos^2 x$.
 67. $y'' + 16y = 2 \sin^2 x$. 68. $y'' - 5y' + 6y = 10 \sin x + e^{2x}$.
 69. $y'' + 2y' + y = xe^{-x}$. 70. $y'' - 7y' + 6y = \sin x + xe^x$.
 71. $y'' + y = 2 \sin x \cdot \sin 2x$. 72. $y''' - 2y'' - 3y' = e^{-2x}$.
 73. $y''' - 2y'' - 3y' = x + 1$. 74. $y''' - y'' + y' - y = 2 \cos x$.
 75. $y''' - 2y'' + 2y' = 5 \cos x + 2x$. 76. $y''' + 4y' = \operatorname{ch}^2 x$.
 77. $y''' - 4y' = \cos^2 x$. 78. $y''' + 16y' = \operatorname{sh}^2 2x$.
 79. $y''' - 16y' = \sin^2 2x$. 80. $y''' - 3y' - 2y = e^{-x}$.
 81. $y''' + y' = 1 + \sin x$. 82. $y''' + y' = 4 + 10e^{2x}$.
 83. $y''' - 2y'' + 5y' = 5x + 4e^x$. 84. $y''' + y' = -2e^x(\cos x + 3 \sin x) - 2 \cos x$.
 85. $y''' - 3y'' - 4y' = -3 \cos x - 5 \sin x + 5e^{-x}$.
 86. $y''' - y'' - 6y' = \cos x + 7 \sin x - 6$. 87. $y''' + y'' - 2y' = 3e^x$.
 88. $y''' + 4y' = 8 \cos 2x$. 89. $y''' + 2y'' + y' = 4 \cos x + 1$.
 90. $y''' - 4y' = 2e^{-x}(3 \cos x + \sin x)$. 91. $y''' + 6y'' + 5y' = -4e^{-x}$.
 92. $y''' - 3y'' + y' - 3y = 6 \sin x - 2 \cos x$.
 93. $y''' - 4y'' + y' - 4y = 2 \cos x - 8 \sin x$.
 94. $y''' + 4y'' + 5y' + 2y = e^{-2x}$. 95. $y''' + 4y'' + 4y' = -4e^{-2x}$.
 96. $y''' - 3y'' + 4y = 6e^{2x}$. 97. $y''' - y'' - y' + y = e^{-x}(3 \sin x - 4 \cos x)$.

98. $y''' - 8y'' + 19y' - 12y = 2e^{3x} - 8 \cos x - 36 \sin x$.
99. $y''' + y'' = e^{-x} + 2 \cos x$. 100. $y''' - 2y'' = \sin x$.
101. $y''' - 2y'' = e^{2x}$. 102. $y''' + y'' - 2y' = e^{3x}$.
103. $y''' + y'' - 2y' = 2 - x$. 104. $y''' + 2y'' = \cos x$.
105. $y''' - 2y'' + 2y' = 4x + \cos x$. 106. $y''' - 16y' = 48x^2 + 2 \cos^2 2x$.
107. $y''' - 2y'' + 2y' = 20 \sin^2 \frac{x}{2}$. 108. $y''' + 4y' = e^{2x} - 8 \sin 2x$.
109. $y''' + y'' + 4y' + 4y = 40 \sin^2 x$. 110. $y''' + 2y'' = 2e^{-2x}$.
111. $y''' - 4y'' + 5y' = 15x^2 - 4x + 8 \sin x$.
112. $y''' - 2y'' + 2y' = 6x^2 + 2 + 20 \cos 2x$.
113. $y''' - 6y'' + 10y' = 13 \cos x + 10x$.
114. $y''' + 2y'' + 5y' = 2x - 17 \sin 2x$.
115. $y''' - 2y'' + y' = 2x + 2 \cos x$. 116. $y''' - 2y'' = 16 \sin 2x - 12x$.
117. $y''' - y'' + y' - y = 4xe^x + 4$. 118. $y''' + y'' + y' + y = 4xe^{-x} + 4$.
119. $y''' - y'' + 4y' - 4y = 40 \cos^2 x$. 120. $y^{IV} - 2y'' + y = 1 + x^2$.
121. $y^{IV} - y = e^x \cos x$. 122. $y^{IV} + 2y'' + y = x^2 + 9 \sin 2x$.

(152-171) Sabitin varyasyonu yöntemiyle çözünüz:

152. $y'' + y = \frac{1}{\sin^2 x}$. 153. $y'' - 3y' + 2y = \frac{1}{1 + e^x}$.
154. $y'' - 3y' + 2y = \frac{e^x}{1 + e^x}$. 155. $y'' - y = \frac{e^x - e^{-x}}{e^x + e^{-x}}$.
156. $y'' - 2y' = 5(3 - 4x)\sqrt{x}$. 157. $y'' - 2y' + 10y = \frac{9e^x}{\cos 3x}$.
158. $y'' - 4y' + 8y = 4(7 - 21x + 18x^2)\sqrt[3]{x}$. 159. $y'' + y = -\operatorname{ctg}^2 x$.
160. $y'' - 4y = (15 - 16x^2)\sqrt{x}$. 161. $y'' + 4y' + 4y = \frac{e^{-2x}}{x + 1}$.
162. $y'' + 3y' = \frac{3x - 1}{x^2}$. 163. $y'' - 4y' + 4y = \frac{2e^{2x}}{1 + x^2}$.
164. $y'' + y' = 7(4 + 3x)\sqrt[3]{x}$. 165. $y'' + 2y' + 2y = \frac{e^{-x}}{\sin x}$.
166. $y'' + 2y = 2 - 4x^2 \sin x^2$. 167. $y'' + 2y' + 5y = \frac{2e^{-x}}{\cos 2x}$.
168. $y'' + 2y' + y = (x + 2) \left(\ln x + \frac{1}{x} \right)$. 169. $y'' - 2y = -2 - 4x^2 \cos x^2$.
170. $y'' - y' = -\frac{x + 1}{x^2}$. 171. $y'' - 2y' = \frac{1}{x} - 2 \ln(ex)$.

(208-226) Her hangi bir yöntemle başlangıç değer probleminin çözümünü bulunuz:

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

209. $y'' - y' - 2y = -18xe^{-x}$, $y(1) = 5e^{-1}$, $y'(1) = 3e^{-1}$.

210. $9y'' + y = 6 \sin \frac{x}{3}$, $y(3\pi) = 0$, $y'(3\pi) = 1$.

211. $y'' + y = \cos(x - 1)$, $y(0) = y'(0) = 0$.

212. $4y'' + y = 4 \cos \frac{x}{2}$, $y(\pi) = 0$, $y'(\pi) = \frac{\pi}{2}$.

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

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

215. $y'' - 3y' + 2y = 2xe^x$, $y(1) = e$, $y'(1) = 5e$.

216. $y'' - 4y' = -8e^{2x} \cos 2x - 8x + 2$, $y(0) = 5$, $y'(0) = -6$.

217. $y'' + 3y' + 2y = -2 \cos 2x - 6 \sin 2x - e^{-2x}$, $y(0) = 3$, $y'(0) = -7$.

218. $y'' - 2y' - 3y = 4 \cos x - 2 \sin x + 4e^{3x}$, $y(0) = 5$, $y'(0) = 7$.

219. $y'' + y = \sin(x - 1)$, $y(0) = y'(0) = 0$.

220. $y'' + y = \frac{1}{\cos x}$, $y(0) = 0$, $y'(0) = 1$.

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

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

223. $y^{IV} - 2y'' + y = 1 + x^2$, $y(0) = y'(0) = y''(0) = y'''(0) = 0$.

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

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

226. $x^2y'' + xy' - y = \ln x$, $y(1) = 2$, $y'(1) = 1$.

Cevaplar:

1. $y = C_1e^x + C_2e^{3x}$.

2. $y = C_1e^{2x} + C_2e^{4x}$.

3. $y = C_1e^{-2x} + C_2e^{-x}$.

4. $y = C_1e^{-x} + C_2e^{2x}$.

5. $y = C_1e^{-3x} + C_2e^{-2x}$.

6. $y = e^{2x}(C_1 \cos 2x + C_2 \sin 2x)$.

7. $y = e^{3x}(C_1 \cos 3x + C_2 \sin 3x)$.

8. $y = e^x(C_1 \cos 3x + C_2 \sin 3x)$.

9. $y = e^{-x}(C_1 \cos 2x + C_2 \sin 2x)$.

10. $y = e^{-x}(C_1 \cos x + C_2 \sin x)$.

11. $y = e^{2x}(C_1x + C_2)$.

12. $y = e^{3x}(C_1x + C_2)$.

13. $y = e^{4x}(C_1x + C_2)$.

14. $y = C_1e^{-4x} + C_2e^{-x} + C_3e^x$.

15. $y = C_1e^{-3x} + C_2e^{-x} + C_3e^x$.

16. $y = C_1e^x + C_2e^{2x} + C_3e^{4x}$.

17. $y = C_1 e^{-2x} + e^{-x}(C_2 x + C_3).$ 18. $y = e^{-2x}(C_1 x + C_2) + C_3 e^x.$
19. $y = C_1 e^x + e^x(C_2 \cos 2x + C_3 \sin 2x).$
20. $y = C_1 e^{-x} + C_2 \cos 2x + C_3 \sin 2x.$
21. $y = C_1 e^{-x} + e^{-x}(C_2 \cos x + C_3 \sin x).$
22. $y = C_1 \cos x + C_2 \sin x + C_3 e^x.$
23. $y = C_1 e^{-x} + C_2 + e^x(C_3 \cos x + C_4 \sin x).$
24. $y = C_1 + C_2 e^x + C_3 e^{2x} + C_4 e^{4x}.$
25. $y = C_1 + e^x(C_2 x + C_3) + C_4 e^{3x}.$
26. $y = C_1 e^{-x} + e^{2x}(C_2 x + C_3) + C_4 e^{3x}.$
27. $y = C_1 e^{-2x} + e^{-x}(C_2 x^2 + C_3 x + C_4).$
28. $y = e^{-x}(C_1 x + C_2) + C_3 \cos x + C_4 \sin x.$
29. $y = C_1 \cos x + C_2 \sin x + e^x(C_3 x + C_4).$
30. $y = e^{-x}(C_1 x + C_2) + e^x(C_3 x + C_4).$
31. $y = C_1 + e^{-2x}(C_2 x^2 + C_3 x + C_4).$
32. $y = C_1 \cos x + C_2 \sin x + C_3 e^{-3x} + C_4 e^x.$
33. $y = C_1 e^{-x} + C_2 e^x + C_3 e^{2x} + C_4 e^{3x}.$
34. $y = C_1 \cos x + C_2 \sin x + C_3 \cos 2x + C_4 \sin 2x.$
35. $y = (C_1 x + C_2) \cos 2x + (C_3 x + C_4) \sin 2x.$
36. $y = C_1 \cos x + C_2 \sin x + C_3 \cos x \sqrt{2} + C_4 \sin x \sqrt{2}.$
37. $y = (C_1 x + C_2) \cos 3x + (C_3 x + C_4) \sin 3x.$
38. $y = e^{-x}(C_1 x^2 + C_2 x + C_3).$
39. $y = C_1 e^x + C_2 e^{2x} + \frac{1}{2} x^2 e^{2x}.$
40. $y = (C_1 + C_2 x) e^{-x} + \frac{x^4}{12} e^{-x}.$
41. $y = C_1 e^{-x} + C_2 e^{2x} + \left(x + \frac{3}{2} x^2\right) e^{-x}.$
42. $y = C_1 e^{2x} + C_2 e^{-3x} + \left(3x^2 - x + \frac{7}{6}\right) e^{-x}.$
43. $y = C_1 e^{-x} + C_2 e^x - \frac{1}{5} e^x (\cos x + 2 \sin x).$
44. $y = e^{\frac{x}{2}} \left(C_1 \sin \frac{x}{2} + C_2 \cos \frac{x}{2}\right) - \frac{2}{5} e^x (\sin x + 2 \cos x).$
45. $y = e^{2x}(C_1 + C_2 x + x^2) + \frac{1}{8}(2x^2 + 4x + 3).$
46. $y = C_1 e^{-2x} + C_2 e^x - \frac{1}{9}(3x^2 + 2x)e^{-2x} - \frac{1}{2}(3 \sin x + \cos x).$

47. $y = C_1 \cos 2x + C_2 \sin 2x + \frac{1}{4}(2x + 1)e^{-2x} + \frac{1}{4}x \cos 2x.$
48. $y = C_1 e^{-3x} + C_2 e^x + \frac{1}{2}(2x^2 + x)e^{-3x} - \frac{1}{5}(2 \cos x - \sin x).$
49. $y = C_1 \cos 3x + C_2 \sin 3x + \frac{1}{9}(3x + 1)e^{-3x} - \frac{1}{2}x \sin 3x.$
50. $y = (C_1 + C_2 x)e^{-3x} + \left(x - \frac{2}{3}\right)e^{3x}.$
51. $y = (C_1 + C_2 x)e^{2x} + (2x + 1)e^{-2x}.$
52. $y = C_1 + C_2 e^{-x} + (x^2 - 3x)e^{-x} + \cos 2x + 2 \sin 2x.$
53. $y = C_1 + C_2 e^x + x(2x - 1)e^x + \cos x + \sin x.$
54. $y = C_1 + C_2 e^{4x} + e^{2x} \cos 2x + x^2.$
55. $y = e^{2x}(C_1 \cos 3x + C_2 \sin 3x) - \cos 2x.$
56. $y = e^{-2x}(C_1 + C_2 x) + x^2 e^{-2x}.$
57. $y = e^x(C_1 \cos 2x + C_2 \sin 2x) + \cos x.$
58. $y = e^{4x}(C_1 \cos 2x + C_2 \sin 2x) - e^{3x} \cos x.$
59. $y = C_1 e^{-3x} + C_2 e^{2x} + x e^{-3x}.$
60. $y = e^x(C_1 + C_2 x) + x^2 e^x.$
61. $y = C_1 e^{3x} + C_2 e^{4x} + x e^{3x}.$
62. $y = C_1 e^{-x} + C_2 e^{3x} - \cos x + x e^{3x}.$
63. $y = C_1 e^{-3x} + C_2 e^x + x^2 e^{-3x}.$
64. $y = C_1 e^{-3x} + C_2 e^{4x} - e^{-2x} \cos x + x e^{-3x}.$
65. $y = C_1 \cos 2x + C_2 \sin 2x + x^2 \cos 2x.$
66. $y = C_1 \cos 2x + C_2 \sin 2x + \frac{1}{4}(1 + x \sin 2x).$
67. $y = C_1 \cos 4x + C_2 \sin 4x + \frac{1}{16}(1 - 2x \sin 4x).$
68. $y = C_1 e^{2x} + C_2 e^{3x} - x e^{2x} + \sin x + \cos x.$
69. $y = e^{-x}(C_1 + C_2 x) + \frac{1}{6}x^3 e^{-x}.$
70. $y = C_1 e^x + C_2 e^{6x} - x \left(\frac{x}{10} + \frac{1}{25}\right) e^x + \frac{1}{74}(7 \cos x + 5 \sin x).$
71. $y = C_1 \cos x + C_2 \sin x + \frac{1}{5}x(\cos x + 2 \sin x) + \frac{1}{8} \cos 3x.$
72. $y = C_1 e^{-x} + C_2 + C_3 e^{3x} - \frac{1}{10}e^{-2x}.$
73. $y = C_1 e^{-x} + C_2 + C_3 e^{3x} - \frac{1}{6}x^2 - \frac{1}{9}x.$
74. $y = C_1 e^x + C_2 \cos x + C_3 \sin x - \frac{1}{2}x(\sin x + \cos x).$
75. $y = C_1 + e^x(C_2 \cos x + C_3 \sin x) + 2 \cos x + \sin x + x \left(\frac{1}{2}x + 1\right).$

76. $y = C_1 + C_2 \sin 2x + C_3 \cos 2x + \frac{x}{8} + \frac{1}{32} \operatorname{sh} 2x.$
77. $y = C_1 + C_2 \operatorname{sh} 2x + C_3 \operatorname{ch} 2x - \frac{x}{8} - \frac{1}{32} \sin 2x.$
78. $y = C_1 + C_2 \sin 4x + C_3 \cos 4x - \frac{x}{32} + \frac{1}{256} \operatorname{sh} 4x.$
79. $y = C_1 + C_2 \operatorname{sh} 2x + C_3 \operatorname{ch} 2x + \frac{x}{32} - \frac{1}{256} \sin 4x.$
80. $y = (C_1 + C_2 x)e^{-x} + C_3 e^{2x} - \frac{x^2}{6} e^{-x}.$
81. $y = C_1 + C_2 \cos x + C_3 \sin x + x - \frac{1}{2} x \sin x.$
82. $y = C_1 + C_2 \cos x + C_3 \sin x + 4x + e^{2x}.$
83. $y = C_1 + e^x(C_2 \cos 2x + C_3 \sin 2x) + e^x + \frac{1}{2} x^2 + \frac{2}{5} x.$
84. $y = C_1 + C_2 \cos x + C_3 \sin x + 2e^x \cos x + x \cos x.$
85. $y = C_1 e^{-x} + C_2 + C_3 e^{4x} - \cos x + x e^{-x}.$
86. $y = C_1 e^{-2x} + C_2 + C_3 e^{3x} + \cos x + x.$
87. $y = C_1 e^{-2x} + C_2 + C_3 e^x + x e^x.$
88. $y = C_1 + C_2 \cos 2x + C_3 \sin 2x - x \cos 2x.$
89. $y = C_1 + e^{-x}(C_2 + C_3 x) - 2 \cos x + x.$
90. $y = C_1 e^{-2x} + C_2 + C_3 e^{2x} + e^{-x} \cos x.$
91. $y = C_1 e^{-x} + C_2 + C_3 e^{-5x} + x e^{-x}.$
92. $y = C_1 \cos x + C_2 \sin x + C_3 e^{3x} + x \cos x.$
93. $y = C_1 \cos x + C_2 \sin x + C_3 e^{4x} - x \cos x.$
94. $y = C_1 e^{-2x} + e^{-x}(C_2 + C_3 x) + x e^{-2x}.$
95. $y = e^{-2x}(C_1 + C_2 x) + C_3 + x^2 e^{-2x}.$
96. $y = e^{2x}(C_1 + C_2 x) + C_3 e^{-x} + x^2 e^{2x}.$
97. $y = C_1 e^{-x} + e^x(C_2 + C_3 x) - e^{-x} \cos x.$
98. $y = C_1 e^x + C_2 e^{3x} + C_3 e^{4x} + 2 \cos x - x e^{3x}.$
99. $y = C_1 + C_2 x + C_3 e^{-x} - \cos x - \sin x + x e^{-x}.$
100. $y = C_1 + C_2 x + C_3 e^{2x} + \frac{1}{5}(\cos x + 2 \sin x).$
101. $y = C_1 + C_2 x + C_3 e^{2x} + \frac{1}{4} x e^{2x}.$
102. $y = C_1 e^{-2x} + C_2 + C_3 e^x + \frac{1}{30} e^{3x}.$
103. $y = C_1 e^{-2x} + C_2 + C_3 e^x + \frac{1}{4}(x^2 - 3x).$
104. $y = C_1 e^{-2x} + C_2 + C_3 x - \frac{1}{5}(2 \cos x + \sin x).$

105. $y = C_1 + e^{-x}(C_2 \cos x + C_3 \sin x) + x^2 + 2x + \frac{1}{5}(2 \cos x + \sin x).$
106. $y = C_1 + C_2 e^{-4x} + C_3 e^{4x} - x^3 - \frac{1}{16} \left(7x + \frac{1}{8} \sin 4x \right).$
107. $y = C_1 + e^x(C_2 \cos x + C_3 \sin x) + 5x - 4 \cos x - 2 \sin x.$
108. $y = C_1 + C_2 \cos 2x + C_3 \sin 2x + x \sin 2x + \frac{1}{16} e^{2x}.$
109. $y = C_1 \cos 2x + C_2 \sin 2x + C_3 e^{-x} + x(2 \cos 2x - \sin 2x) + 5.$
110. $y = C_1 e^{-2x} + C_2 + C_3 x + \frac{1}{2} x e^{-2x}.$
111. $y = C_1 + e^{2x}(C_2 \cos x + C_3 \sin x) + x^3 + 2x^2 + 2x + \sin x - \cos x.$
112. $y = C_1 + e^x(C_2 \cos x + C_3 \sin x) + x^3 + 3x^2 + 4x + 2 \cos 2x - \sin 2x.$
113. $y = C_1 + e^{3x}(C_2 \cos x + C_3 \sin x) + \frac{1}{2} x^2 + \frac{3}{5} x + \frac{2}{3} \cos x + \sin x.$
114. $y = C_1 + e^{-x}(C_2 \cos 2x + C_3 \sin 2x) + \frac{1}{5} x^2 - \frac{4}{25} x + 2 \sin 2x + \frac{1}{2} \cos 2x.$
115. $y = C_1 + (C_2 + C_3 x)e^x + x^2 + 4x + \cos x.$
116. $y = C_1 + C_2 x + C_3 e^{2x} + x^3 + \frac{3}{2} x^2 + \sin 2x + \cos 2x.$
117. $y = C_1 e^x + C_2 \cos x + C_3 \sin x + (x^2 - 2x)e^x - 4.$
118. $y = C_1 e^{-x} + C_2 \cos x + C_3 \sin x + (x^2 + 2x)e^{-x} + 4.$
119. $y = C_1 e^x + C_2 \cos 2x + C_3 \sin 2x - x(2 \cos 2x + \sin 2x) - 5.$
120. $y = e^x(C_1 + C_2 x) + e^{-x}(C_3 + C_4 x) + x^2 + 5.$
121. $y = C_1 e^{-x} + C_2 e^x + C_3 \sin x + C_4 \cos x - \frac{1}{5} e^x \cos x.$
122. $y = (C_1 + C_2 x) \cos x + (C_3 + C_4 x) \sin x + \sin 2x + x^2 - 4.$
152. $y = C_1 \cos x + C_2 \sin x + 1 + \frac{1}{2} \ln \left| \frac{1 + \sin x}{1 - \sin x} \right|.$
153. $y = C_1 e^x + C_2 e^{2x} + (e^x + e^{2x})[x - \ln(1 + e^x)] + e^x + \frac{1}{2}.$
154. $y = C_1 e^x + C_2 e^{2x} + (e^x - e^{2x})[x - \ln(1 + e^x)] - e^x.$
155. $y = C_1 e^{-x} + C_2 e^x + 2 \operatorname{arctg} e^x \cdot \operatorname{ch} x - 1.$
156. $y = C_1 + C_2 e^{2x} + 4x^2 \sqrt{x}.$
157. $y = e^x(C_1 \cos 3x + C_2 \sin 3x) + e^x(\ln |\cos 3x| \cos 3x + 3x \sin 3x).$
158. $y = e^{2x}(C_1 \cos 2x + C_2 \sin 2x) + 9x^2 \sqrt[3]{x}.$
159. $y = C_1 \cos x + C_2 \sin x + 2 - \frac{1}{2} \ln \left| \frac{1 + \cos x}{1 - \cos x} \right| \cos x.$
160. $y = C_1 e^{-2x} + C_2 e^{2x} + 4x^2 \sqrt{x}.$
161. $y = e^{-2x}(C_1 + C_2 x) + e^{-2x}[(x + 1) \ln |x + 1| - x].$

162. $y = C_1 e^{-3x} + C_2 + \ln|x|$.
163. $y = e^{2x}(C_1 + C_2 x) + e^{2x}[2x \operatorname{arctg} x - \ln(1+x^2)]$.
164. $y = C_1 e^{-x} + C_2 + 9x^2 \sqrt[3]{x}$.
165. $y = e^{-x}(C_1 \cos x + C_2 \sin x) + e^{-x}(\ln|\sin x| \sin x - x \cos x)$.
166. $y = C_1 \cos(x\sqrt{2}) + C_2 \sin(x\sqrt{2}) + \sin x^2$.
167. $y = e^{-x}(C_1 \cos 2x + C_2 \sin 2x) + e^{-x}\left(x \sin 2x + \frac{1}{2} \ln|\cos 2x| \cos 2x\right)$.
168. $y = e^{-x}(C_1 + C_2 x) + x \ln x$. 169. $y = C_1 e^{-x\sqrt{2}} + C_2 e^{x\sqrt{2}} + \cos x^2$.
170. $y = C_1 + C_2 e^x + \ln|x|$. 171. $y = C_1 + C_2 e^{2x} + x \ln x$.
207. $y = \frac{C_1}{x} + C_2 x^2 + \frac{4}{x^2}$. 208. $y = x \cos x$.
209. $y = (3x^2 + 2x)e^{-x}$. 210. $y = (3\pi - x) \cos \frac{x}{3}$.
211. $y = \frac{1}{2} \sin 1 \sin x + \frac{1}{2} x \sin(x-1)$. 212. $y = (x-2\pi) \cos \frac{x}{2}$.
213. $y = \cos 1 \sin x - x \cos(x+1)$. 214. $y = e^x(x^2 - 3x + 2)$.
215. $y = 8e^{2x-1} - (x^2 + 2x + 4)e^x$. 216. $y = 6 - 2e^{4x} + e^{2x} \cos 2x + x^2$.
217. $y = (x+6)e^{-2x} - 4e^{-x} + \cos 2x$. 218. $y = (x+3)e^{3x} + 3e^{-x} - \cos x$.
219. $y = \frac{1}{2} \cos 1 \sin x - \frac{1}{2} x \cos(x-1)$. 220. $y = (x+1) \sin x + \cos x \ln|\cos x|$.
221. $y = (1-x+x \ln x)e^{-x}$. 222. $y = (1-x+x \ln x)e^x$.
223. $y = x^2 + 5 + \left(\frac{3}{4}x - \frac{5}{2}\right)e^x - \left(\frac{3}{4}x + \frac{5}{2}\right)e^{-x}$.
224. $y = \frac{1}{x^2} \ln x$. 225. $y = \frac{1}{6}x^2(x-1)$.
226. $y = 2x - \ln x$.

(40-50) Eğrilerine ortogonal olan yörüngeleri bulunuz:

40. $y = C(x+1)e^{-x}$. 41. $y^2 = Ce^{x^2+y^2}$.
42. $(Ce^{-x^2} - 1)y = 2$. 43. $y = C \sin x - 2$.
44. $y(1 + Ce^x) = 1$. 45. $y = C \cos x + 2$.
46. $e^x = C(1 - e^{-y})$. 47. $1 + e^y = C(1 + x^2)$.
48. $y^2 = Ce^{-(x+y)}$. 49. $xy = Ce^y$.
50. $2x + y - 1 = Ce^{2y-x}$.