

1. The general solution of  $y'' - 2y' - 8y = 10e^{3x} + 2$  is:

(a)  $y = C_1e^{-4x} + C_2e^{2x} - \frac{1}{2}e^{3x} - \frac{1}{4}$

(b)  $y = C_1e^{4x} + C_2e^{-2x} + 2e^{3x} - 4$

(c)  $y = C_1e^{-4x} + C_2e^{2x} + \frac{1}{4}e^{3x} + \frac{1}{4}$

(d)  $y = C_1e^{4x} + C_2e^{-2x} - 2e^{3x} - \frac{1}{4}$

(e) None of the above.

2. The general solution of  $y'' - y' - 2y = 5 \cos 2x$  is:

(a)  $y = C_1e^{2x} + C_2e^{-x} - \frac{1}{4} \cos 2x - \frac{3}{4} \sin 2x$

(b)  $y = C_1e^{2x} + C_2e^{-x} - \frac{3}{4} \cos 2x - \frac{1}{4} \sin 2x$

(c)  $y = C_1e^{-2x} + C_2e^x + \frac{3}{4} \cos 2x + \frac{1}{2} \sin 2x$

(d)  $y = C_1e^{2x} + C_2e^{-x} + \frac{1}{2} \cos 2x - \frac{1}{4} \sin 2x$

(e) None of the above.

3. The general solution of  $y'' - 2y' + y = 2e^{3x} + 8e^{-3x}$  is:

(a)  $y = C_1e^x + C_2xe^x + \cosh 3x$

(b)  $y = C_1e^x + C_2xe^x + 2e^{3x} - 2e^{-3x}$

(c)  $y = C_1e^x + C_2xe^x + \frac{1}{4}e^{3x} - \frac{1}{2}e^{-3x}$

(d)  $y = C_1e^x + C_2xe^x + \frac{1}{2}e^{3x} + \frac{1}{4}e^{-3x}$

(e) None of the above.

4. A particular solution of  $y'' - 2y' - 15y = 4e^{3x} - 10$  is:

(a)  $z = -\frac{1}{3} - \frac{2}{3}e^{3x}$

(b)  $z = \frac{1}{2} - \frac{4}{3}e^{3x}$

(c)  $z = -\frac{2}{3} - \frac{1}{3}e^{3x}$

(d)  $z = \frac{2}{3} - \frac{1}{3}e^{3x}$

(e) None of the above.

5. The general solution of  $y'' - 2y' - 15y = 4e^{5x} - 10$  is:

(a)  $y = C_1e^{3x} + C_2e^{-5x} + \frac{2}{3} + \frac{1}{2}e^{5x}$

(b)  $y = C_1e^{-3x} + C_2e^{5x} - \frac{1}{2} - \frac{2}{3}xe^{5x}$

- (c)  $y = C_1e^{-3x} + C_2e^{5x} + \frac{2}{3} + \frac{1}{2}xe^{5x}$
- (d)  $y = C_1e^{-3x} + C_2e^{5x} - \frac{2}{3} + \frac{1}{2}e^{5x}$
- (e) None of the above.

6. A particular solution of  $y'' + 7y' + 12y = -4e^{-3x} + 7e^{4x}$  is:

- (a)  $z(x) = -2xe^{-3x} + \frac{1}{4}e^{4x}$
- (b)  $z(x) = -4xe^{-3x} + \frac{1}{8}e^{4x}$
- (c)  $z(x) = 4xe^{-3x} - \frac{1}{8}e^{4x}$
- (d)  $z(x) = 4e^{-3x} + \frac{1}{8}xe^{4x}$
- (e) None of the above.

7. A particular solution of  $y'' - 6y' + 9y = 4e^{3x} + 3$  is:

- (a)  $z = 2x^2e^{3x} + \frac{1}{3}$
- (b)  $z = 2xe^{3x} + \frac{2}{3}$
- (c)  $z = 2xe^{3x} + \frac{1}{3}$
- (d)  $z = 2x^2e^{3x} + \frac{2}{3}$
- (e) None of the above.

8. A particular solution of  $y'' + 4y' + 4y = -3e^{2x} + 6e^{-2x} + 8$  is:

- (a)  $z = 3x^2e^{-2x} + \frac{3}{8}e^{2x} - 2$
- (b)  $z = 3x^2e^{-2x} - \frac{3}{16}e^{2x} + 2$
- (c)  $z = -3x^2e^{-2x} + \frac{3}{16}e^{2x} - 4$
- (d)  $z = 6x^2e^{-2x} - \frac{3}{8}e^{2x} + 2$
- (e) None of the above.

9. A particular solution of  $y'' - 2y' = 6e^{2x} + 4$  is:

- (a)  $z = 2 + 4xe^{2x}$
- (b)  $z = 2x + 2xe^{2x}$
- (c)  $z = 4 + 2e^{2x}$
- (d)  $z = 3xe^{2x} - 2x$
- (e) None of the above.

10. The general solution of  $y'' + 9y = 3 \cos 2x$  is:

- (a)  $y = C_1 \cos 3x + C_2 \sin 3x + \frac{3}{5} \cos 2x$

- (b)  $y = C_1 \cos 3x + C_2 \sin 3x - \frac{2}{5} \sin 2x$
- (c)  $y = C_1 \cos 3x + C_2 \sin 3x - \frac{3}{5} \cos 2x + \frac{2}{5} \sin 2x$
- (d)  $y = C_1 \cos 3x + C_2 \sin 3x + \frac{3}{5} \sin 2x - \frac{1}{5} \cos 2x$
- (e) None of the above.
11. A particular solution of  $y'' + 9y = 3x \cos 2x - 7x$  will have the form:
- (a)  $z = Ax \cos 2x + Bx \sin 2x + Cx$
- (b)  $z = Ax \cos 2x + Bx \sin 2x + Cx + D$
- (c)  $z = (Ax + B) \cos 2x + (Cx + D) \sin 2x + Ex + F$
- (d)  $z = A \cos 2x + B \sin 2x + Cx^2 + Dx + E$
- (e) None of the above.
12. The general solution of  $y'' + 9y = 7 \sin 3x + 4x$  will have the form:
- (a)  $y = C_1 \cos 3x + C_2 \sin 3x + Ax \cos 3x + Bx \sin 3x + Cx$
- (b)  $y = C_1 \cos 3x + C_2 \sin 3x + A \cos 3x + B \sin 3x + Cx + D$
- (c)  $y = C_1 \cos 3x + C_2 \sin 3x + Ax \cos 3x + Bx \sin 3x + Cx + D$
- (d)  $y = C_1 \cos 3x + C_2 \sin 3x + Ax \cos 3x + Bx \sin 3x + Cx^2 + Dx + E$
- (e) All of the above.
13. A particular solution of  $y'' + 4y' + 20y = 2xe^{4x} + 3e^{-2x} \sin 4x$  will have the form:
- (a)  $z = Axe^{4x} + Cxe^{-2x} \cos 4x + Dxe^{-2x} \sin 4x$
- (b)  $z = (Ax + B)e^{4x} + Cxe^{-2x} \cos 4x + Dxe^{-2x} \sin 4x$
- (c)  $z = (Ax + B)e^{4x} + Ce^{-2x} \cos 4x + De^{-2x} \sin 4x$
- (d)  $z = (Ax + B)e^{4x} + (Cx + D)e^{-2x} \cos 4x + (Ex + F)e^{-2x} \sin 4x$
- (e) None of the above.
14. A particular solution of  $y'' + 9y' = 6 \cos 3x - 2 \sin 2x + 3x + 1$  will have the form:
- (a)  $z = A \cos 3x + B \sin 3x + C \cos 2x + D \sin 2x + Ex + F$
- (b)  $z = Ax \cos 3x + Bx \sin 3x + C \cos 2x + D \sin 2x + Ex^2$
- (c)  $z = Ax \cos 3x + Bx \sin 3x + C \cos 2x + D \sin 2x + Ex + F$
- (d)  $z = A \cos 3x + B \sin 3x + C \cos 2x + D \sin 2x + Ex^2 + Fx$
- (e) None of the above.

15. The general solution of  $y'' + 4y' + 4y = 5e^{-2x} \cos x + 6x$  will have the form:
- $y = C_1e^{-2x} + C_2xe^{-2x} + Ae^{-2x} \cos x + Be^{-2x} \sin x + Cx + D$
  - $y = C_1e^{-2x} + C_2xe^{-2x} + Ae^{-2x} \cos x + Be^{-2x} \sin x + Cx$
  - $y = C_1e^{2x} + C_2xe^{2x} + Ae^{-2x} \cos x + Be^{-2x} \sin x + Cx + D$
  - $y = C_1e^{-2x} + C_2xe^{-2x} + Ae^{-2x} \cos x + Be^{-2x} \sin x + Cx^2 + Dx$
  - None of the above.
16. A particular solution of  $y'' + 4y' + 4y = 5xe^{-2x} + 3xe^{2x}$  will have the form:
- $z = (Ax^3 + Bx^2)e^{-2x} + (Dx + E)e^{2x}$
  - $z = Ax^3e^{-2x} + Bxe^{2x}$
  - $z = (Ax^2 + Bx)e^{-2x} + (Cx + D)e^{2x}$
  - $z = Ax^2e^{-2x} + (Bx + C)e^{2x}$
  - None of the above.
17. A particular solution of  $y'' - 5y' + 6y = (2x - 8)e^{-2x} + (5x + 3)e^{2x}$  will have the form:
- $z = Axe^{-2x} + Cx^2e^{2x}$
  - $z = (Ax + B)e^{-2x} + (Cx + D)e^{2x}$
  - $z = (Ax + B)e^{-2x} + (Cx^2 + Dx)e^{2x}$
  - $z = (Ax^2 + Bx)e^{-2x} + (Cx^2 + Dx)e^{2x}$
  - None of the above.
18. A particular solution of  $y'' + 2y' + 10y = 3e^{3x} \sin x + 4xe^{3x}$  will have the form
- $z = Axe^{3x} \cos x + Bxe^{3x} \sin x + Ce^{3x}$
  - $z = Ae^{3x} \cos x + Be^{3x} \sin x + (Cx + D)e^{3x}$
  - $z = Ae^{3x} \cos 3x + Be^{3x} \sin 3x + Cxe^{3x}$
  - $z = Ae^{3x} \sin 3x + Bxe^{3x}$
  - None of the above.
19. A particular solution of  $y'' + 2y' + 10y = 2e^{-x} \cos 3x + (2x^2 + 3x)e^{3x}$  will have the form
- $z = Axe^x \cos 3x + Bxe^x \sin 3x + (Cx^2 + Dx + E)e^{3x}$
  - $z = Axe^{-3x} \cos x + Bxe^{-3x} \sin x + (Cx^2 + Dx)e^{3x}$
  - $z = Axe^{-x} \cos 3x + Bxe^{-x} \sin 3x + (Cx^2 + Dx)e^{3x}$
  - $z = Axe^{-x} \cos 3x + Bxe^{-x} \sin 3x + (Cx^2 + Dx + E)e^{3x}$

(e) None of the above.

20. A particular solution of  $y'' - 2y' - 8y = 2e^{-x} \cos 3x - (2x^2 + 2x)e^{-2x} + 4xe^{4x}$  will have the form

(a)  $z = Ae^{-x} \cos 3x + Be^{-x} \sin 3x + (Cx^2 + Dx + E)e^{-2x} + (Fx + G)e^{4x}$

(b)  $z = Ae^{-x} \cos 3x + Be^{-x} \sin 3x + (Cx^3 + Dx^2 + Ex)e^{-2x} + Fe^{4x}$

(c)  $z = Ae^{-x} \cos 3x + Be^{-x} \sin 3x + (Cx^3 + Dx^2 + Ex)e^{-2x} + (Fx^2 + Gx)e^{4x}$

(d)  $z = Ae^{-x} \cos 3x + Be^{-x} \sin 3x + (Cx^3 + Dx)e^{-2x} + (Ex + F)e^{4x}$