

Solve the following DE.

1. $y'' + (y')^2 + 1 = 0$
2. $xy'' = y' + x(y')^2$
3. $xy'' = y' + (y')^3$
4. $y'' + 2y(y')^3 = 0$
5. $y' - xy'' - (y'')^3 = 1$
6. $y'' = 1 + (y')^2$
7. $ye^{xy} \frac{dx}{dy} + xe^{xy} = 12y^2; y(0) = -1$
8. $x^2y'' - xy' + 2y = 0$
where $y_1 = x \sin(\ln x)$
9. $(1 + 2x)y'' + 4xy' - 4y = 0$
where $y_1 = e^{-2x}$
10. $3y'' - y' = 0$
11. $y'' + 9y = 0$
12. $4y''' + 4y'' + y' = 0$
13. $y'' - y' - 42y = 0$
14. $y'' + 16y = 0$
and $y(0) = 2; y'(0) = -2$
15. $y'' - y = 0$
and $y(0) = y'(0) = 1$
16. $y^{(4)} = 0$
 $y(0) = 2; y'(0) = 3$
 $y''(0) = 4; y'''(0) = 5$
17. $4y'' - 4y' - 3y = 0$
 $y(0) = 1; y'(0) = 5$
18. $y'' - 3y' + 2y = 0$
 $y(1) = 0; y'(1) = 1$
19. $y''' + 12y'' + 36y' = 0$
 $y(0) = 0; y'(0) = 1; y''(0) = -7$
20. $y' + 3x^2y = x^2$
21. $\frac{dx}{dy} = x + y$
22. $y''' + 2y'' - 5y' - 6y = 0$
 $y(0) = y'(0) = 0; y''(0) = 1$
23. $y'' - 8y' + 17y = 0$
 $y(0) = 4; y'(0) = -1$
24. $xdy = (x \sin x - y)dx$
25. $(1 + e^x) \frac{dy}{dx} + e^x y = 0$
26. $y'' + 3y' + 2y = 0$
 $y(1) = 0; y'(1) = 1$