

Exercise 4.2

2. Solution: $y_2 = e^{-x}$.

11. Solution: $y_2 = -1$. Hint: integration by change of variable $u = \ln x$.

24. Solution: $y_2 = c_1 x \int \frac{e^x}{x^2} dx = c_1 \left(-1 + x \ln x + \frac{1}{2!} x^2 + \frac{1}{2(3!)} x^3 + \frac{1}{3(4!)} x^4 + \dots \right)$, for $x \in (0, \infty)$.

Exercise 4.3

12. Solution: $y = e^{-x/2} [c_1 \cos(x/2) + c_2 \sin(x/2)]$.

22. Solution: $y = c_1 e^{2x} + c_2 x e^{2x} + c_3 x^2 e^{2x}$.

30. Solution: $y = -\sqrt{3} \cos \theta + \sin \theta$.

59. Solution: $c[y''' - (11/2)y'' + 7y' + 5y] = 0$, for any $c \in \mathbb{R} \setminus \{0\}$.

Exercise 4.4

2. Solution: $y = c_1 \cos(3/2)x + c_2 \sin(3/2)x + 5/3$.

34. Solution: $x = -\frac{F_0}{\omega^2 - \gamma^2} \cos \omega t + \frac{F_0}{\omega^2 - \gamma^2} \cos \gamma t$.

38. Solution: $y = c_2 e^x \sin x + x$.