

Exercise 2.5

6. Solution: $x^2y = c(y + 2x)$.
14. Hint: let $x = vy$. Solution: $y \ln |x/y| = -e$.
22. Solution: $y^{3/2} = 1 + 7e^{-3x/2}$.
24. Solution: $(x + y)^2 = 2x + c$.
31. Hint: since $M(tx, ty) = t^\alpha M(x, y)$, let $t = 1/x$.
36. Hint: Let $u = \ln y$. Solution: $y = e^{ex-1/x}$.

Exercise 4.1

14. Solution: (a) Not possible (b) Not possible (c) $y = c_1x^2 - (c_1 + 3)x^4 + 3$
(d) $y = -x^2 + x^4 + 3$.
18. Solution: Since $1 \cdot \cos 2x + 1 \cdot 1 + (-2) \cdot \cos^2x = 0$ the set of functions is linearly dependent.
35. Solution: (b) The first solution is $y_p = x^2 + 3x + 3e^{2x}$, and the second solution is $y_p = -2x^2 - 6x - (1/3)e^{2x}$.
39. Hint for (a) and (b): discuss the two cases when $x \geq 0$ and $x < 0$.
Solution for (e): Neither is the general solution on $(-\infty, \infty)$. They are the general solution on an interval for which $a_2(x) \neq 0$ for every x in the interval.