Hints and Answers for Appendix A

1. $y(t) = ke^t - e^{-2t}$

3. $y(t) = ke^t - \frac{1}{5}\cos 2t + \frac{2}{5}\sin 2t$

5. $y(t) = ke^{-2t} + \frac{3}{7}e^{t/3}$; take $k = 4/7$ for the initial-value problem.

7. $y(t) = ke^{-t} + \frac{1}{5}\cos 2t + \frac{2}{5}\sin 2t$; take $k = 24/5$ for the initial-value problem.

9. *Hint*: The guess $y_p(t) = a\cos 3t$ leads to terms involving both $\cos 3t$ and $\sin 3t$ on the left.

11. *Hint*: Simply insert $y_h(t)$, $y_1(t)$, and $y_2(t)$ into their respective equations and add.

13. $y(t) = ke^{-2t} + \frac{1}{2}t^2 + \frac{1}{2}t + \frac{1}{4} + \frac{1}{6}e^{4t}$; take $k = -5/12$ for the initial-value problem.

15. $y(t) = ke^{-3t} + \frac{3}{13}\cos 2t + \frac{2}{13}\sin 2t + \frac{1}{6}e^{3t} - e^{-4t}$; take $k = 47/78$ for the initial-value problem.

17. Tends to a solution that satisfies $-1/2 \le y(t) \le 1$.

19. $y(t) \to 3$ as $t \to \infty$

21. **(a)** $a_1 = 1$, $a_2 = -2$
(b) $y(t) = \frac{1}{2}e^{-t} - \frac{1}{2}e^{-3t}$

23. **(a)** $a_1 = 1$, $a_2 = -2$
(b) *Hint*: The Taylor series for $y(t) = te^{-2t}$ is $t - 2t^2 + 2t^3 + \ldots$.