

Chapter 1 Selected Answers

Section 1.1

- 1.
2. Substitute and show that both sides are equal.
3. Hint: This does not use logarithms.
- 4.
5. Hint: $y = 0$ is not the correct guess. Why not?

Section 1.2

Section 1.3

Section 1.4

1. (a) $y(x) = 5e^x - 4$
(b) $y(x) = -2\sqrt{1+x^2}$
(c) $y(x) = \frac{2}{1-2\arctan x}$
2. $\approx 12,298$
3. $\approx 0.0776\%$
4. ≈ 2.078 minutes
5. ≈ 5381.5 years
6. $\frac{14R^{5/2}}{15r^2\sqrt{2g}}$
- 7.

Section 1.5

1. (a) $y(x) = e^x(x+C)$
(b) $y(x) = \frac{1}{2}\left(1 + \frac{3}{x^2}\right)$
(c) $y(x) = e^{x^2}\left(C + \frac{1}{2}\sqrt{\pi}\operatorname{Erf}(x)\right)$

2. (c) $A \approx 0.258$ gm
3. (b) $A \approx 2.7444$ gm
- 4.
5. $A \approx \$985,367$
6. $A \approx \$2,034,380$
- 7.

Chapter 2 Selected Answers

Section 2.1

1. ≈ 2.574 hours
2. (b) approaches 100%
3. (b) ≈ 188 trillion

Section 2.2

1. (a) $x = 2$ is stable, $x = 6$ is unstable
(b) $x = 0$ is unstable, $x = 1$ is semistable
(c) $x = 0$ is stable

Section 2.3

1. (b) ≈ 5.25 sec

Section 2.4

- 1.

Chapter 3 Selected Answers

Section 3.1

- 1.
2. Hint: Think about a trig identity.
3. Hint: At some point, let $v(x) = u'(x)$.

Section 3.2

Section 3.3

1. (a) $y = c_1 e^{4x} + c_2 e^x$
(b) $y = c_1 e^{\frac{(5+\sqrt{41})x}{2}} + c_2 e^{\frac{(5-\sqrt{41})x}{2}}$
(c) $y = e^{x/8} \left(c_1 \cos \frac{3\sqrt{7}}{8}x + c_2 \sin \frac{3\sqrt{7}}{8}x \right)$
(d) $y = c_1 e^{2x} + c_2 x e^{2x}$
(e) $y = c_1 e^{-x} + c_2 \cos 2x + c_2 \sin 2x$
2. $y = -\frac{1}{2} + \frac{1}{2} e^{4x}$
3. $y = e^{2ix} (e^x - e^{-x})$

Section 3.4

1. $t = \sqrt{\frac{3}{980}}(2n+1)\pi, n \in \text{integers}$
2. $t = \frac{3(2n+1)\pi}{8\sqrt{2}}, n \in \text{integers}$

3. Hint: Look at the algebraic representation of ω_0 .
- 4.
- 5.

Section 3.5

1. (a) $y_p = At^3 + Bt^2 + Ct + D$
(b) $y_p = At + B + (Ct + D) \cos 3t + (Et + F) \sin 3t$
(c) $y_p = (At^3 + Bt^2 + Ct) e^t + (Dt^2 + Et + F) e^{3t}$
(d) $y_p = (At^2 + Bt) \cos 2t + (Ct^2 + Dt) \sin 2t + E \cos 3t + F \sin 3t$
2. (a) $y = c_1 e^{-2x} + c_2 x e^{-2x} + \frac{1}{4}(x-1)$
(b) $y = c_1 e^{-2x} + c_2 x e^{-2x} + \frac{1}{2} x^2 e^{-2x}$
3. (a) $y = c_1 e^x + c_2 e^{-x} - \frac{1}{4} e^{-x} (1+2x)$
(b) $y = c_1 e^x + c_2 e^{2x} - (x+1)e^x + e^{2x} \ln(1+e^{-x}) + e^x \ln(1+e^x)$

Section 3.6

Section 3.7

1. $q(t) = \frac{CE_0}{CL\omega^2 - 1} \left(\cos \frac{t}{\sqrt{LC}} - \cos \omega t \right)$
- 2.
- 3.
4. $i_{ss}(t) = \frac{30}{5281} (41 \cos 60t + 60 \sin 60t)$