Chapter 8 Even Answers

2. (a) 80.0 J (b) 10.7 J (c) 0
4. (b) 35.0 J
6. (a) 22.0 J, 40.0 J (b) Yes, $\Delta K + \Delta U \neq 0$
8. (a) –9.00 J, No (conservative force) (b) 3.39 m / s (c) 9.00 J
10. (a) 19.8 m / s (b) 294 J (c) (30.0**i** – 39.6**j**) m / s
12. $d = \dfrac{kx^2}{2mg \sin \theta} - x$
14. 1.92 m / s
16. (a) 0.537 m / s (b) 0.0588 m
18. 1.84 m
20. 914 N / m
22. (a) $\sqrt{\dfrac{2(m_1 - m_2)gh}{m_1 + m_2}}$ (b) $\dfrac{2m_1 h}{m_1 + m_2}$
24. 40.8°
26. (a) 14.0 m / s (b) 31.3 m / s (c) 24.2 m / s (d) 44.9 m
28. 2.06 kN
30. 26.5 m / s
32. 3.68 m / s
34. 168 J
36. (a) 24.5 m / s (b) Yes (c) 206 m (d) unrealistic
38. (a) 0.381 m (b) 0.143 m (c) 0.371 m
40. 44.1 kW
42. $(7 - 9x^2y)\mathbf{i} - 3x^3\mathbf{j}$
44. See Instructor's Manual
46. (a) stable (b) neutral (c) unstable
48. (a) 8.19×10^{-14} J (b) 3.60×10^{-8} J (c) 1.80×10^{14} J (d) 5.38×10^{41} J
52. (a) 0.588 J (b) 0.588 J (c) 2.42 m / s (d) $U_C = 0.392$ J, $K_C = 0.196$ J
54. 33.4 kW (44.8 hp)
56. (a) 100 J (b) 0.410 J (c) 2.84 m / s (d) –9.80 mm (e) 2.85 m / s
58. 0.115
60. (a) $(3x^2 - 4x - 3)\mathbf{i}$ (b) $x = 1.87$ and –0.535
(c) $x = -0.535$ (stable), and $x = 1.87$ (unstable)
62. (a) 0.378 m (b) 2.30 m / s (c) 1.08 m
64. (b) 7.42 m / s
66. $\dfrac{h}{5}(4 \sin^2 \theta + 1)$
68. 100.6°
72. at $h = 2H / 3$ or at $h = R$, whichever is smaller
74. 3.92 kJ