Elementary Engineering Mathematics
Exercises #10 Answers

1. $W_{A\to B} \approx -286.6$ (in-lb)

2. $W_{A\to B} \approx -286.46$ (in-lb), so $\%\,\text{error} = -0.05\%$

3. a) $v(t) = 4t$ (m/s) for $0 \le t \le 5$
   $v(t) = 20$ (m/s) = constant for $5 \le t \le 10$
   $v(t) = 40 - 2t$ (m/s) for $10 \le t \le 20$
   b) $s(t) = 2t^2$ (m) for $0 \le t \le 5$
   $s(t) = -50 + 20t$ (m) for $5 \le t \le 10$
   $s(t) = -150 + 40t - t^2$ (m) for $10 \le t \le 20$
   c) total distance traveled is 250 (m)

4. a) $y(t)\big|_{t=3.5} \approx 65.3$ (ft)
   b) total distance traveled is 109 (ft)

5. a) $v(t) = 20 - 9.81t$ (m/s)
   b) $y(t) = 8 + 20t - 4.905t^2$ (m)

6. $M(x) = 375x - 50x^2$ (ft-lb) for $0 \le x \le 5$
   $M(x) = 1250 - 125x$ (ft-lb) for $5 \le x \le 10$

7. a) $v(t) = 4\left(1 - e^{-2t}\right)$ (volts)
   b) $p(t) = 8\left(e^{-2t} - e^{-4t}\right)$ (watts)
   c) $w(t) = 2 - 4e^{-2t} + 2e^{-4t}$ (joules)
   As $t \to \infty$, $w \to 2$ (joules)

8. $i(t) = \frac{1}{3\pi}\left[1 - \cos(120\pi t)\right]$ (amps)