

**ENGR 1990 Engineering Mathematics  
Homework #10 Answers**

1.  $W_{A \rightarrow B} \approx -286.6$  (in-lb)
2.  $W_{A \rightarrow B} = -286.46$  (in-lb), so % error =  $-0.05\%$
3. a)  $v(t) = 4t$  (m/s) for  $0 \leq t \leq 5$   
 $v(t) = 20$  (m/s) = constant for  $5 \leq t \leq 10$   
 $v(t) = 40 - 2t$  (m/s) for  $10 \leq t \leq 20$   
b)  $s(t) = 2t^2$  (m) for  $0 \leq t \leq 5$   
 $s(t) = -50 + 20t$  (m) for  $5 \leq t \leq 10$   
 $s(t) = -150 + 40t - t^2$  (m) for  $10 \leq t \leq 20$   
c) total distance traveled is 250 (m)
4. a)  $s(t)|_{t=3.5} = 65.3$  (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  $0 \leq x \leq 5$   
 $M(x) = 1250 - 125x$  (ft-lb) for  $5 \leq x \leq 10$
7. a)  $v(t) = 4(1 - e^{-2t})$  (volts)  
b)  $p(t) = 8(e^{-2t} - e^{-4t})$  (watts)  
c)  $w(t) = 2 - 4e^{-2t} + 2e^{-4t}$  (joules). As  $t \rightarrow \infty$ ,  $w \rightarrow 2$  (joules)
8.  $i(t) = \frac{1}{3\pi}[1 - \cos(120\pi t)]$  (amps)