

**ENGR 1990 Engineering Mathematics**  
**Homework #1 – Application of Lines**

1.  $k_{\text{avg}} \approx 57.4$  (lb/in),  $y_0 = 0.174$  (in)
  
2. a)  $a_{\text{avg}} = -9.72$  (ft/s<sup>2</sup>)  
b)  $v(t) = 121 - 9.72t$  ( $0 \leq t \leq t^*$ )  
c)  $v_0 = 82.4$  (mi/hr)  
d)  $t^* \approx 12.4$  (sec)
  
3. a) acceleration phase:  $v(t) = 15.9t$  ( $0 \leq t \leq 5$ )  
deceleration phase:  $v(t) = 126 - 9.25t$  ( $5 \leq t \leq t^*$ )  
b)  $t^* \approx 13.6$  (sec)  
c)  $t^* = (5a_1 - 79.5)/a_1$  ( $a_1$  in ft/s<sup>2</sup>)  
d)  $v_{\text{max}} \approx 54.2$  (mi/hr)
  
4. a)  $R_{\text{avg}} = 8.00$  (ohms)  
b)  $V = 8.00I$  ( $V$  is in volts, and  $I$  is in amps)
  
5. a)  $R \approx 8.57$  (ohms)  
b)  $I = \left(\frac{1}{8.57}\right)V - 0.583$  ( $V$  is in volts, and  $I$  is in amps)