

Elementary Engineering Mathematics
Exercises #1 – Application of Lines

1. $k_{\text{avg}} \approx 57.4$ (lb/in), $y_0 \approx 0.174$ (in)

2. a) $a_{\text{avg}} \approx -9.72$ (ft/s²)
b) $v(t) \approx 121 - 9.72t$ ($0 \leq t \leq t^*$)
c) $v_0 \approx 82.4$ (mi/hr)
d) $t^* \approx 12.4$ (sec)

3. a) acceleration phase: $v(t) \approx 15.9t$ ($0 \leq t \leq 5$)
deceleration phase: $v(t) \approx 126 - 9.25t$ ($5 \leq t \leq t^*$)
b) $t^* \approx 13.6$ (sec)
c) $t^* = (5a_1 - 79.5)/a_1$ (a_1 in ft/s²)
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) $I \approx \left(\frac{1}{8.57}\right)V - 0.583$ (V is in volts, and I is in amps)