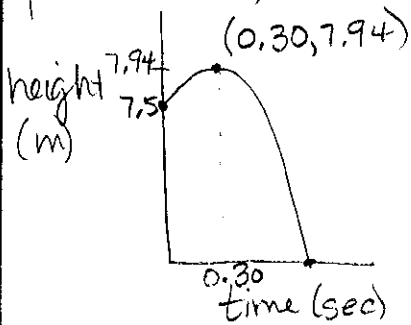


# 7.8 Foundations of Math II

p. 437 #5, 6

5.

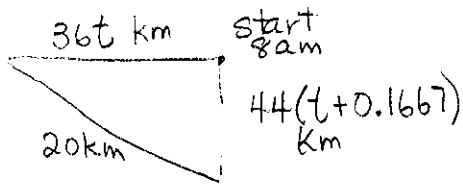


$$\begin{aligned}
 h(t) &= a(t - 0.3)^2 + 7.94 \\
 7.5 &= a(0 - 0.3)^2 + 7.94 \\
 7.5 &= a(-0.3)^2 + 7.94 \\
 7.5 &= a(0.09) + 7.94 \\
 -0.44 &= a(0.09) \\
 -4.89 &= a
 \end{aligned}$$

height at the water is 0

$$\begin{aligned}
 h(t) &= -4.89(t - 0.3)^2 + 7.94 \\
 0 &= -4.89(t - 0.3)^2 + 7.94 \\
 -7.94 &= -4.89(t - 0.3)^2 \\
 1.62 &= (t - 0.3)^2 \\
 1.27 &= t - 0.3 \\
 1.57 &= t \quad \text{1.57 sec. to hit water}
 \end{aligned}$$

6.



$$\begin{aligned}
 (36t)^2 + [44(t - 0.1667)]^2 &= 20^2 \\
 1296t^2 + (44t - 7.3348)^2 &= 400 \\
 1296t^2 + 1936t^2 - 645.4624t + 53.7993 &= 400 \\
 3232t^2 - 645.4624t - 346.2007 &= 0
 \end{aligned}$$

$$10 \text{ min} = \frac{10}{60} = 0.1667 \text{ hr.}$$

$$\begin{aligned}
 a &= 3232 \\
 b &= -645.4624 \\
 c &= -346.2007
 \end{aligned}$$

$$\begin{aligned}
 (44t - 7.3348)^2 &= \\
 (44t - 7.3348)(44t - 7.3348) &= \\
 1936t^2 - 322.7312t - 322.7312t + 53.7993 &= \\
 1936t^2 - 645.4624t + 53.7993 &=
 \end{aligned}$$

see next page

p. 437 cont.

6. cont

$$t = \frac{-645.4624 \pm \sqrt{(645.4624)^2 - 4(3232)(-346.2007)}}{2(3232)}$$

$$t = \frac{645.4624 \pm \sqrt{416621.7098 + 4475682.65}}{6464}$$

$$t = \frac{645.4624 \pm \sqrt{4892304.359}}{6464}$$

$$t = \frac{645.4624 \pm 2211.8554}{6464}$$

$$t = \frac{645.4624 + 2211.8554}{6464} \quad \text{or} \quad \frac{645.4624 - 2211.8554}{6464}$$

$$t = \frac{2857.3178}{6464}$$

$$= \frac{-1566.393}{6464}$$

$$t = 0.4420 \text{ hr.}$$

-0.24 time cannot  
be negative

$$0.4420 \text{ hr.} \cdot \frac{60 \text{ min}}{1 \text{ hr}} = 26.52 \text{ min}$$

$$= 27 \text{ min}$$

$$8:00 \text{ am start} + 27 \text{ min} = 8:27 \text{ am}$$