Math 120
Autumn 1999
Quiz 1 Solutions

1. $x = \dfrac{17}{4}$

2. $-2x(x-10)(x+2)$

3. $-\dfrac{2}{3} \pm \dfrac{\sqrt{10}}{3}$

4. $\dfrac{2x-1}{3(2-x)}$

5. $L = \dfrac{45T^2}{\pi^2}$

6. Using similar triangles, $\dfrac{8}{4+\ell} = \dfrac{5}{\ell}$. The solution of this equation is $\ell = \dfrac{20}{3}$.

7. (a) Position of A is $(0, 1-40t)$. At $t = 2$ minutes $= \dfrac{1}{30}$ hours, A is at $(0, 1-40\cdot\dfrac{1}{30}) = (0, -\dfrac{1}{3})$, i.e., one third of a mile south of the intersection.

   (b) B : $(30t, 0)$

   (c) Solve $\sqrt{(30t)^2 + (1-40t)^2} = 2$. The key steps are

$$\begin{aligned} 900t^2 + 1600t^2 - 80t + 1 &= 4 \\ 2500t^2 - 80t - 3 &= 0 \end{aligned}$$

$$\begin{aligned} t &= \frac{80 \pm 10\sqrt{364}}{5000} \\ &= \frac{8 + \sqrt{364}}{5000} \text{ (one root doesn't make sense)} \\ &\approx .005 \text{ hours} \\ &\approx 32 \text{ seconds.} \end{aligned}$$