Math 120 A Spring 2017
Mid-Term Exam Number One
April 20, 2017
Answers

There were two versions.

In version A, in problem 1, Tristan starts at the point $(10, -3)$.

1. (a) $x = 10 - \frac{3}{2}t, y = -3 + \frac{11}{2}t$ (b) $x = 5 + 2t, y = 4 + \frac{2}{3}t$ (c) $\frac{924}{641} \approx 1.441497$ hours after midnight
2. Let $D(t)$ be the distance from Anna to her starting point after t hours. Then

$$D(t) = \begin{cases} 2t & \text{if } 0 \leq t \leq 3, \\ \sqrt{36 + 9(t-3)^2} & \text{if } 3 \leq t \leq 4, \\ \sqrt{(6 + 5(t-4))^2 + 9} & \text{if } 4 \leq t \leq 6. \end{cases}$$

3. $\frac{-4+\sqrt{51}+\sqrt{91}}{8} \approx 1.585102555$ hours.
4. (a) -3 (b) $10x + 5h + 1$

In version B, in problem 1, Tristan starts at the point $(9, -1)$.

1. (a) $x - 9 - \frac{3}{2}t, y = -1 + \frac{7}{2}t$ (b) $x = 4 + 2t, y = 4 - t$ (c) $\frac{16}{13} \approx 1.23076$
2. Let $D(t)$ be the distance from Anna to her starting point after t hours. Then

$$D(t) = \begin{cases} 4t & \text{if } 0 \leq t \leq 3 \\ \sqrt{144 + (6(t-3))^2} & \text{if } 3 \leq t \leq 4 \\ \sqrt{(12 + 10(t-4))^2 + 36} & \text{if } 4 \leq t \leq 6. \end{cases}$$

3. $\frac{-8+\sqrt{75}+\sqrt{91}}{12} \approx 0.8499705$ hours.
4. (a) -2 (b) $6x + 3h + 1$