

Math 120 A, B - Winter 2011
Mid-Term Exam Number One
January 27, 2011
Answers

There were two versions of the exam in use.

Version A - In problem 1, Josephine starts 7 km west of the buoy.

1. 2.5482 hours

2. (a) 29.1666
(b)

$$\text{area}(x) = \begin{cases} 50m & \text{if } 0 \leq m \leq 0.5, \\ 50 - \frac{25}{2m} & \text{if } 0.5 \leq m \leq 1. \end{cases}$$

3. (a) $x = 3 - \frac{6}{\sqrt{90}}t, y = 1 + \frac{18}{\sqrt{90}}t$
(b)

$$\text{distance}(t) = \sqrt{\left(5 - \left(3 - \frac{6}{\sqrt{90}}t\right)\right)^2 + \left(8 - \left(1 + \frac{18}{\sqrt{90}}t\right)\right)^2}$$

4. (a) $-6x - 3h + 9$ (b) $x = -5$ is the only solution.

Version B - In problem 1, Josephine starts 3 km east of the buoy.

1. 2.40036 hours

2. (a) 46.2857
(b)

$$\text{area}(x) = \begin{cases} 72m & \text{if } 0 \leq m \leq 0.5, \\ 72 - \frac{18}{m} & \text{if } 0.5 \leq m \leq 1. \end{cases}$$

3. (a) $x = -4 + \frac{12}{\sqrt{80}}t, y = 2 + \frac{24}{\sqrt{80}}t$
(b)

$$\text{distance}(t) = \sqrt{\left(1 - \left(-4 + \frac{12}{\sqrt{80}}t\right)\right)^2 + \left(1 - \left(2 + \frac{24}{\sqrt{80}}t\right)\right)^2}$$

4. (a) $-8x - 8h + 20$ (b) $x = -1$ is the only solution.