Problem 4

Undergraduate Problem Solving Contest
due January 31, 2017

January 17, 2017

1 Trains

A watchtower W sitting at the origin of $\mathbb{R}^2$ can see 2 trains A, B. The position γ_A of train A at time t is given by:

$$\gamma_A(t) = (3t + 2, t + 1)$$

. Likewise, the position at time t of train B is:

$$\gamma_B(t) = (2t + 5, 3\sqrt{t + 1} - 1)$$

. Over the interval $t \in [0, 6]$, when the distance between A, B is greatest, what is the sin of the angle $\angle AWB$?

Solutions need only be correct to 3 *decimal places, please show your work.*

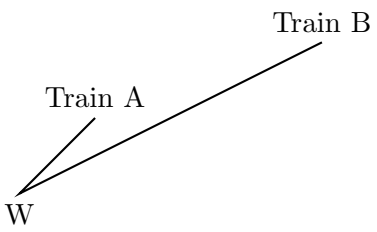

Figure 1: Picture of $\angle AWB$ at $t = 0$ - not to scale