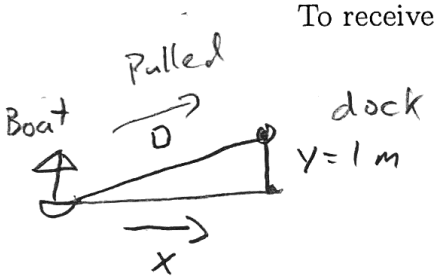
MA 16010 Quiz 6

Lesson 16

28 February 2022

Problem 1. A boat is pulled into a dock by a rope attached to the front of the boat and passing through a pulley on the dock that is 1 meter higher than the front of the boat. If the boat is pulled at a rate of 1 m/s, how fast is the boat approaching the dock when it is 8 meters away from the dock?

To receive full credit you must show your work.



$\frac{dD}{dt} = 1 \text{ m/s}$

$\frac{dx}{dt} = ?$ ← what we want

speed of Boat when it is 8 meters away.

$D^2 = x^2 + y^2$

$D^2 = x^2 + 1^2$

$\frac{d}{dt}[D^2] = \frac{d}{dt}[x^2 + 1]$

$2D\frac{dD}{dt} = 2x\frac{dx}{dt}$

$\frac{dx}{dt} = \frac{D}{x}\frac{dD}{dt}$

$= \frac{\sqrt{65}}{8}(1 \text{ m/s})$

$= \frac{\sqrt{65}}{8} \text{ m/s}$

When $x = 8$,

$D = \sqrt{8^2 + 1^2} = \sqrt{65}$

(x, y)