

MATH 111-007 QUIZ 5

OCTOBER, 11TH, 2021

Problem 1. Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ where $x^2 + 4y^2 = 1$. (Simplify your final answer, to the best of your ability).

Problem 2. A runner and a rower are having a race by the straight portion of a river. They begin at the same starting line and go in the same direction (parallel to each other). The runner is running at a pace of 6 meters per second along the shore, while the rower rows at 8 meters per second, in the middle of a still river of 20 meters wide.

Question: find the rate at which the distance between the two is changing 1 minute into the race.

Do steps 1-4 correctly for full credit and step 5 for a bonus of 2 points.

- (1) Sketch;
- (2) Introduce and label the variables;
- (3) Find the relationship between the variables;
- (4) Write down what is known and exactly what the question is looking for in terms of your variables.
- (5) Solve (bonus).