Math 241: HW 3

Due on Wednesday, June 12

Summer '13

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Problem 1

Water runs into a conical tank at a rate of $9\frac{ft^3}{min}$. The tank stands pointing down and has a height of $10ft$ and a base radius of $5ft$. How fast is the water level rising when the water is $6ft$ deep?

Problem 2

Consider the implicit function

$$y^4 - 4y^2 = x^4 - 9x^2$$

Show that the point $(-3, 2)$ is indeed on the graph and give the equation of the tangent line.

Problem 3

A boat is pulled by a rope towards a dock. The dock is $6ft$ above the boat and the rope is pulled in (from the top of the dock) at a rate of $2\frac{ft.}{sec.}$. How fast is the boat moving toward the dock when $10ft$ of rope is out? How fast is the angle between the dock and the rope decreasing at this instant?

Problem 4

Approximate the following with differentials:

$$\cos(\frac{29\pi}{90})$$

$$\sqrt[3]{28}$$

Note this is slightly different from the problem given in class