

MATH 333 – Section 002 – Quiz 1

You may work with other class members on this quiz, but you may *not* receive assistance from people not in MATH 333 (Section 002). You must show all of your work to receive full credit. Do all your work on other sheets of paper and be sure to staple all the pieces of paper together or YOU WILL GET A 'ZERO' ON THE QUIZ. Do not use decimal approximations unless asked to do so. Your work on this quiz must be handed in by Friday, 1 September 2006 at 1040. GOOD LUCK!

- 1) Show that $y(t) = \arctan t$ is a solution of the differential equation

$$y'' = -2t(y')^2.$$

- 2) Find the general solution of the differential equation

$$y' = t \sin 2t.$$

- 3) Solve the initial value problem

$$\begin{cases} y' = \cos^3 5t \sin 5t \\ y(0) = 1. \end{cases}$$

- 4) Suppose a radioactive substance has a half-life of 5000 years. How long will it take for the substance to lose 30% of its mass? Give the exact answer and an appropriate estimate.

- 5) Consider the differential equation

$$y' = y^3 - 6y^2 + 9y.$$

Sketch representative solution curves such as those in the lower figure by Example 1.3.2 on page 18. Your picture should include the entire ty -plane.