

MATH 175 – Section 004 – Quiz 9

You may work with other class members on this quiz, but you may *not* receive assistance from people not in MATH 175 (Section 004). 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. You may use Maple only when explicit permission is given. Your work on this quiz must be handed in by Monday, 10 November 2003 at 1:40 p.m. **GOOD LUCK!**

- 1) Consider the curve given in polar coordinates by

$$r = 1 - 2 \cos \theta.$$

This curve has an outer loop and an inner loop.

- a) Give a range of values of θ that will produce the inner loop.
- b) Find the area of the inner loop. Give an exact answer and an appropriate estimate.

- 2) Consider the curve given in polar coordinates by

$$r = \cos \theta. \tag{1}$$

Find the length of this curve using two different methods:

- a) Method 1 – use the formula for arclength in polar coordinates.
 - b) Method 2 – convert (1) to Cartesian coordinates and proceed from there.
- 3) Consider the curve given in polar coordinates by

$$r = \frac{2}{1 - \sin \theta}.$$

Find an equation of the line tangent to this curve at $y = 2$.