Mathematics 172

Quiz 20 Name: Key

You must show your work to get full credit.

For the system of differential equatoins

$$\frac{dx}{dt} = .15xy$$
$$\frac{dy}{dt} = -.1x - .2y$$

1. If $x(3) = 1$ and $y(3) = 2$ compute

$x'(3) =$ .3 $\qquad$ $y'(3) =$ -.5

$x'(3) = .15\,x(3)y(3)$
$= .15\,(1)(2)$
$= .3$

$y'(3) = -.1\,x(1) - .2\,y(1)$
$= -.1\,(1) - .2\,(2)$
$= -.5$

2. Use what you have just computed to do the following approximations:

$x(3.05) \approx$ 1.015 $\qquad$ $y(3.05) \approx$ 1.975

$x(3.05) \approx x(3) + x'(3)(.05)$
$= 1 + .3(.05)$
$= 1.015$

$y(3.05) \approx y(3) + y'(3)(.05)$
$= 2 - .5(.05)$
$= 1.975$