Arts & Science 1D06 Quiz #9   25 February 2016
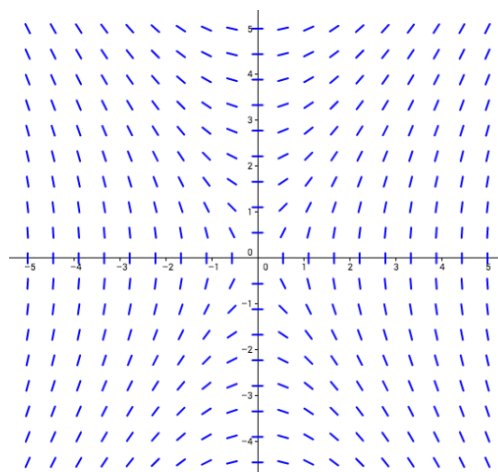
Full Name:_____SOLUTIONS_____   Student # :_____

TA:_____Max Lazar_____

Please provide detailed solutions to the problems below. Correct responses without justification may not receive full credit. The use of a calculator is permitted.

[4 marks]

(1) Explain why the slope field diagram below cannot represent the differential equation $y' = x + y$.

The given slope field has zero slope along the y-axis, i.e. when $x = 0$. However,

$$y'\Big|_{x=0} = (x+y)\Big|_{x=0} = 0 \text{ if and only if } y = 0.$$

[6 marks]

Thus the given slope field diagram cannot describe the differential equation $y' = x + y$.

(2) Sketch a slope field diagram for the differential equation $y' = x(1 - y)$. Sketch a solution curve that passes through the point $(0, 2)$.