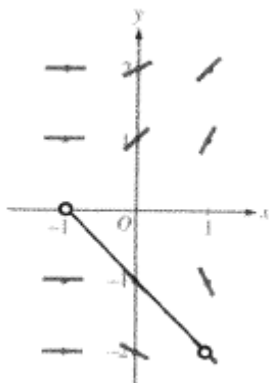


“MR. CALCULUS” ANSWERS TO THE 2010 FORM B FREE RESPONSE QUESTIONS

AB 5

$$\frac{dy}{dx} = \frac{x+1}{y}$$

(a)



(b) $\frac{dy}{dx} = -1$ when $\frac{x+y}{y} = -1$, that is, $y = -x - 1$ and $y \neq 0$.

(c) $\int y dy = \int (x+1) dx$, so $\frac{y^2}{2} = \frac{x^2}{2} + x + C$.

$$y(0) = -2 \Rightarrow C = 2 \Rightarrow \frac{y^2}{2} = \frac{x^2}{2} + x + 2. \Rightarrow y^2 = x^2 + 2x + 4 \Rightarrow |y| = \sqrt{x^2 + 2x + 4}.$$

Since initial condition has $y < 0$, we will choose $y = \boxed{y = -\sqrt{x^2 + 2x + 4}}$.