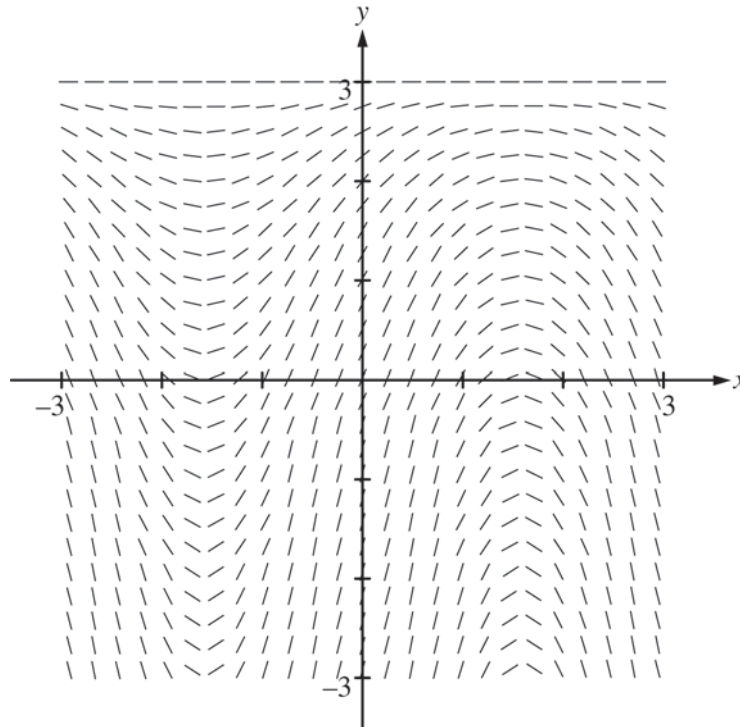


**2014 AP<sup>®</sup> CALCULUS AB FREE-RESPONSE QUESTIONS**

6. Consider the differential equation  $\frac{dy}{dx} = (3 - y)\cos x$ . Let  $y = f(x)$  be the particular solution to the differential equation with the initial condition  $f(0) = 1$ . The function  $f$  is defined for all real numbers.
- (a) A portion of the slope field of the differential equation is given below. Sketch the solution curve through the point  $(0, 1)$ .



- (b) Write an equation for the line tangent to the solution curve in part (a) at the point  $(0, 1)$ . Use the equation to approximate  $f(0.2)$ .
- (c) Find  $y = f(x)$ , the particular solution to the differential equation with the initial condition  $f(0) = 1$ .

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**STOP**

**END OF EXAM**