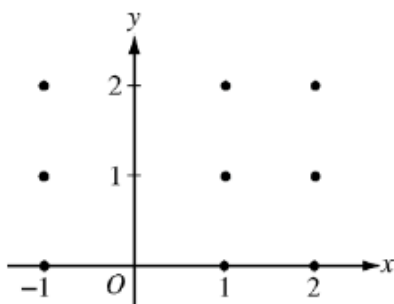


**2008AB5 [non-calculator]**

Consider the differential equation  $\frac{dy}{dx} = \frac{y-1}{x^2}$ , where  $x \neq 0$ .

- (a) On the axes provided, sketch a slope field for the given differential equation at the nine points indicated.  
(Note: Use the axes provided in the exam booklet.)

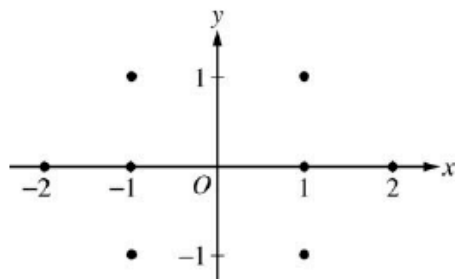


- (b) Find the particular solution  $y = f(x)$  to the differential equation with the initial condition  $f(2) = 0$ .  
(c) For the particular solution  $y = f(x)$  described in part (b), find  $\lim_{x \rightarrow \infty} f(x)$ .

**2006AB5 [non-calculator]**

Consider the differential equation  $\frac{dy}{dx} = \frac{1+y}{x}$ , where  $x \neq 0$ .

- (a) On the axes provided, sketch a slope field for the given differential equation at the eight points indicated.  
(Note: Use the axes provided in the pink exam booklet.)

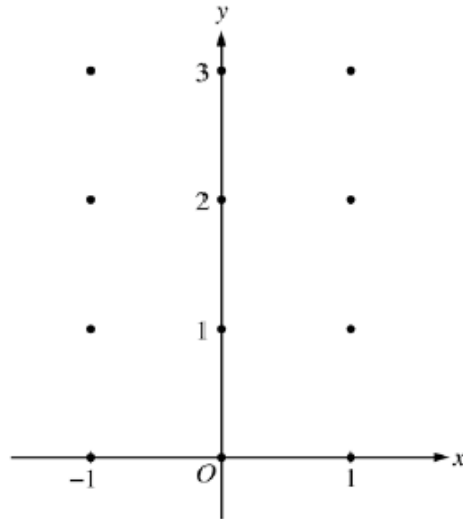


- (b) Find the particular solution  $y = f(x)$  to the differential equation with the initial condition  $f(-1) = 1$  and state its domain.

**2006AB4 [non-calculator]**

Consider the differential equation  $\frac{dy}{dx} = x^2(y - 1)$ .

- (a) On the axes provided, sketch a slope field for the given differential equation at the twelve points indicated.  
(Note: Use the axes provided in the pink test booklet.)



- (b) While the slope field in part (a) is drawn at only twelve points, it is defined at every point in the  $xy$ -plane. Describe all points in the  $xy$ -plane for which the slopes are positive.
- (c) Find the particular solution  $y = f(x)$  to the given differential equation with the initial condition  $f(0) = 3$ .

**2003AB6 [non-calculator]**

Let  $f$  be the function satisfying  $f'(x) = x\sqrt{f(x)}$  for all real numbers  $x$ , where  $f(3) = 25$ .

- (a) Find  $f''(3)$ .

- (b) Write an expression for  $y = f(x)$  by solving the differential equation  $\frac{dy}{dx} = x\sqrt{y}$  with the initial condition  $f(3) = 25$ .