

1. Solve

$$y' = \frac{ax+b}{cx+d},$$

where  $a, b, c,$  and  $d$  are constants.

參  
考  
用

20%

2. Find the orthogonal trajectories of the family of curves

$$x^2 - y^2 = cx.$$

20%

3. Solve the system

$$2 \frac{dx}{dt} - x + \frac{dy}{dt} + 4y = 1,$$

$$\frac{dx}{dt} - \frac{dy}{dt} = t - 1.$$

20%

4. Solve

$$y' = \frac{-2xy}{1+x^2}, \quad y(2) = -5.$$

20%

5. Find a formula involving integrals for a particular solution of the differential equation

$$y''' - 3y'' + 3y' - y = g(x).$$

If  $g(x) = x^{-2}e^x$ , determine the particular solution  $y_p(x)$ .

20%