

EDDE. PROBLEM SET 3

1. Solve the differential equations:

a) $(x + y)y' + y = 0$;

b) $xy' = y + \sqrt{y^2 - x^2}$;

c) $xy' = y(1 + \ln y - \ln x)$;

d) $(x^2 + 2xy)y' = y^2$;

e) $y' = \frac{2y^2 - xy}{x^2 - xy + y^2}$.

2. Solve the differential equations:

a) $y' + 2xy = xe^{-x^2}$;

b) $2xy' = y + \frac{3}{2}x^2$;

c) $y' + y \cos x = \frac{1}{2} \sin 2x$;

d) $y' = \frac{y}{\sin x} + \tan \frac{x}{2}$;

e) $y' + \frac{xy}{1+x^2} = \frac{\sqrt{1+x^2}}{x^2}$.

3. Solve the differential equations:

a) $y' + \frac{y}{x} = y^2 \ln x$;

b) $xy' + y = y^2 \ln x$;

c) $xy' - y = y^2$;

d) $y' + \frac{y}{x+1} + \frac{(x+1)^3}{2}y^3 = 0$;

e) $(1 - x^2)y' - xy = xy^2$.