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Chapter 7. Differential Equations

2. Separable Differential Equations

① Solve the following differential equations:

a) $(1+x)dy - y dx = 0$

f) $\frac{dy}{dx} = -2xy^2$

b) $y' = y - 4$

g) $y' - (y-1)^2 = 0$

c) $y' = \sin 5x$

h) $y' = (x+1)^2$

d) $dx + e^{3x} dy = 0$

i) $y' = e^{3x+2y}$

e) $xy' = 4y$

② Find the particular solution of the diff. equation

a) $y'e^{x^2} = y$, $y(4) = 1$

b) $y' - y^2 \sin x$, $y(0) = 1$

c) $x \frac{dy}{dx} = y^2 - y$, $y(0) = 0$

d) $2yy' = 2x+1$, $y(-2) = -1$

e) $y' = (y-1)^2$, $y(0) = 1$.

3. First-Order Linear Differential Equations

Exe.:

$$(1) \quad y' - 3y = 6$$

$$(2) \quad y' - \frac{1}{x}y = xe^x$$

$$(3) \quad y' + y = e^{3x}$$

$$(4) \quad x^2 y' + xy = 1$$

$$(5) \quad y' + 2xy = x^3$$

$$(6) \quad xy' + 2y = 3$$