

Key Problems

Problem 1.

Solve the differential equations:

a) $y' = 3t^2 + 2$

b) $ty' = 1$

c) $y' = t\sqrt{t^2 + 1}$

Problem 2.

Solve the differential equations:

a) $y' = 5y$

b) $y' = y^2t$

c) $y' = 5y(1 - y/10)$

Problem 3.

Solve the differential equations:

a) $y' + 3y = 6$

b) $y' - 2ty = 4t$

c) $y' + 2y = e^t$

Problem 4.

Solve the exact differential equations:

a) $3t^2 - 2t + 2y \cdot y' = 0$

b) $2y - 3t^2 + 2(y + t)y' = 0$

c) $\frac{y(1 - 2 \ln t)}{t^3} + \frac{\ln t}{t^2} \cdot y' = 0$

Exercise problems

Exercise problems Eriksen [E] 9.1 - 9.23

Optional problems Workbook [WB] 10.1 - 10.18

Answers to Key Problems

Problem 1.

a) $y = t^3 + 2t + C$

b) $y = \ln |t| + C$

c) $y = \frac{1}{3}(t^2 + 1)\sqrt{t^2 + 1} + C$

Problem 2.

a) $y = Ke^{5t}$

b) $y = -2/(t^2 + 2C)$

c) $y = 10 \cdot Ke^{5t}/(1 + Ke^{5t})$

Problem 3.

a) $y = 2 + Ce^{-3t}$

b) $y = -2 + Ce^{t^2}$

c) $y = \frac{1}{3}e^t + Ce^{-2t}$

Problem 4.

a) $y = \pm\sqrt{t^2 - t^3 + C}$

b) $y = -t \pm \sqrt{t^2 + t^3 + C}$

c) $y = \frac{Ct^2}{\ln t}$