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Problem Set 1.1 – 5

Solve the ODE by integration or by remembering a differentiation formula.

**5.**  $y' = 4e^{-x} \cos x$

Problem Set 1.1 – 9

(a) Verify that  $y$  is a solution of the ODE. (b) Determine from  $y$  the particular solution of the IVP. (c) Graph the solution of the IVP.

**9.**  $y' + 4y = 1.4, \quad y = ce^{-4x} + 0.35, \quad y(0) = 2$

Problem Set 1.3 – 13, 17

Solve the INITIAL VALUE PROBLEM (IVP). Show the steps of derivation, beginning with the general solution.

**13.**  $y' \cosh^2 x = \sin^2 y, \quad y(0) = \frac{1}{2}\pi$

**17.**  $xy' = y + 3x^4 \cos^2(y/x), \quad y(1) = 0$   
(Set  $y/x = u$ )

Problem Set 1.4 – 9, 13, 15

Test for exactness. If exact, solve. If not, use an integrating factor as given or obtained by inspection or by the theorems in the text. Also, if an initial condition is given, find the corresponding particular solution.

**9.**  $e^{2x}(2 \cos y dx - \sin y dy) = 0, \quad y(0) = 0$

13.  $e^{-y} dx + e^{-x}(-e^{-y} + 1) dy = 0, \quad F = e^{x+y}$

15. **Exactness.** Under what conditions for the constants  $a, b, k, l$  is  $(ax + by) dx + (kx + ly) dy = 0$  exact? Solve the exact ODE.

Problem Set 1.5 – 9

Find the general solution. If an initial condition is given, find also the corresponding particular solution and graph or sketch it. (Show the details of your work.)

9.  $y' + y \sin x = e^{\cos x}, \quad y(0) = -2.5$

Problem Set 1.5 – 25, 27

Using a method of this section or separating variables, find the general solution. If an initial condition is given, find also the particular solution and sketch or graph it.

25.  $y' = 3.2y - 10y^2$

27.  $y' = 1/(6e^y - 2x)$