

ASSIGNMENT-03

Last Date of Submission: 15-05-2022, 11:59PM, Sunday (in the Google Classroom)

Topic: Exact Differential Equations

Determine, whether the following differential equations are exact or not. Solve those that are exact.

01. $(3x + 2y)dx + (2x + y)dy = 0$

02. $(3x^2y + 2)dx - (x^3 + y)dy = 0$

03. $(6xy + 2y^2 - 5)dx + (3x^2 + 4xy - 6)dy = 0$

04. $(\theta^2 + 1)\cos r dr + 2\theta \sin r d\theta = 0$

05. $\left(\frac{x}{y^2} + x\right)dx + \left(\frac{x^2}{y^3} + y\right)dy = 0$

Solve the following initial value problems:

06. $(2xy - 3)dx + (x^2 + 4y)dy = 0, \quad y(1) = 2$

07. $(ye^x + 2e^x + y^2)dx + (e^x + 2xy)dy = 0, \quad y(0) = 6$

08. Find the value of A, so that the differential equation is exact.

(i) $(x^2 + 3xy)dx + (Ax^2 + 4y)dy = 0$

(ii) $(Ax^2y + 2y^2)dx + (x^3 + 4xy)dy = 0$

09. Find the most general function N(x, y) such that the differential equation is exact.

(i) $(x^3 + xy^2)dx + N(x, y)dy = 0$

(ii) $(x^{-2}y^{-2} + xy^{-3})dx + N(x, y)dy = 0$

10. Find the most general function M(x, y) such that the differential equation is exact.

(i) $M(x, y)dx + (2x^2y^3 + x^4y)dy = 0$

(ii) $M(x, y)dx + (2ye^x + y^2e^{3x})dy = 0$
