4.) $e^{2x}(2y+2)\,dx + e^{2x}\,dy = 0$; $y(0) = 2$

$M = e^{2x}(2y+2) = 2ye^{2x} + 2e^{2x}$ $\quad\quad N = e^{2x}$

$M_y = 2e^{2x}$ $\quad\quad N_x = 2e^{2x}$

$M_y = N_x \rightarrow$ PD eksak

$F_x(x,y) = M$

$F(x,y) = \int 2ye^{2x} + 2e^{2x}\,dx + g(y)$

$F(x,y) = ye^{2x} + e^{2x} + g(y)$

$F_y(x,y) = N$

$\frac{\partial}{\partial y}\, ye^{2x} + e^{2x} + g(y) = e^{2x}$

$e^{2x} + 0 + g'(y) = e^{2x}$

$g'(y) = 0$

$g(y) = c$

$F(x,y) = c$

$ye^{2x} + e^{2x} + g(y) = c$

$ye^{2x} + e^{2x} = c$

$y(0) = 2$

$2.e^{2.0} + e^{2.0} = c$

$2 + 1 = c$

$c = 3$

$\therefore$ Solusi PD: $F(x,y) = c$

$ye^{2x} + e^{2x} = 3$

$e^{2x}(y+1) = 3$

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

$M = 3x^2 - y^2$ $\qquad$ $N = 2y - 2xy$

$M_y = -2y$ $\qquad$ $N_x = -2y$

$M_y = N_x \rightarrow$ PD eksak

$F_x(x,y) = M$

$F(x,y) = \int 3x^2 - y^2 \, dx + g(y)$

$F(x,y) = x^3 - xy^2 + g(y)$

$F_y(x,y) = N$

$$\frac{\partial}{\partial y} x^3 - xy^2 + g(y) = 2y - 2xy$$

$$-2xy + g'(x) = 2y - 2xy$$

$$g'(y) = 2y$$

$$g(y) = \int 2y \, dy$$

$$g(y) = y^2$$

$F(x,y) = c$

$x^3 - xy^2 + y^2 = c$

$y(2) = 0$

$2^3 - 2 \cdot 0^2 + 0^2 = c$

$c = 8$

$\therefore$ Solusi PD : $F(x,y) = c$

$x^3 - xy^2 + y^2 = 8$