

g) ea

8a) $x^4 + x^3y + xy^2 + y^3 = 0 + 0 + 0 + 8 = 8$ at $(0, 2)$

b) $y = \frac{-1}{4t^3 + c}$ $1 = \frac{-1}{c}$ $y = \frac{-1}{4t^3 - 1} = \frac{1}{1 - 4t^3}$

c) $y = (t+c)e^{7t}$ $5 = c$ $y = (t+5)e^{7t}$

d) $y = 2e^{-t} + c_1 e^{-t} \sin 2t + c_2 e^{-t} \cos 2t$
 $y' = -2e^{-t} + c_1 (-e^{-t} \sin 2t + 2e^{-t} \cos 2t) + c_2 (-e^{-t} \cos 2t - 2e^{-t} \sin 2t)$
 $4 = 2 + c_2$ $c_2 = 2$
 $0 = -2 + c_1(2) + c_2(-1) = -4 + 2c_1$ $c_1 = 2$

$y = 2e^{-t} + 2e^{-t} \sin 2t + 2e^{-t} \cos 2t$

e) $y = \frac{1}{5} t e^{3t} + c_1 e^{-2t} + c_2 e^{3t}$
 $y' = \frac{1}{5} e^{3t} + \frac{3}{5} t e^{3t} - 2c_1 e^{-2t} + 3c_2 e^{3t}$
 $5 = 0 + c_1 + c_2$ $0 = \frac{1}{5} - 2c_1 + 3c_2$ $\begin{bmatrix} 1 & 1 & | & 5 \\ -2 & 3 & | & -\frac{1}{5} \end{bmatrix} \xrightarrow{+2R_1} \begin{bmatrix} 1 & 1 & | & 5 \\ 0 & 5 & | & \frac{49}{5} \end{bmatrix}$ $c_1 = \frac{125 - 49}{25} = \frac{76}{25}$
 $c_2 = \frac{49}{25}$

$y = \frac{1}{5} t e^{3t} + \frac{76}{25} e^{-2t} + \frac{49}{25} e^{3t}$

f) ~~$y = -2t^2 - 1 + c_1 \sin 2t + c_2 \cos 2t$
 $y' = -4t + 2c_1 \cos 2t - 2c_2 \sin 2t$
 $0 = -1 + c_2$ $c_2 = 1$
 $4 = 0 + 2c_1$ $c_1 = 2$~~

~~$y = -2t^2 - 1 + 2\sin 2t + \cos 2t$~~

$y = -2t^2 - 1 + c_1 e^{2t} + c_2 e^{-2t}$
 $y' = -4t + 2c_1 e^{2t} - 2c_2 e^{-2t}$

$0 = -1 + c_1 + c_2$ $4 = 0 + 2c_1 - 2c_2$ $\begin{bmatrix} 1 & 1 & | & 1 \\ 2 & -2 & | & 4 \end{bmatrix}$
 $\begin{bmatrix} 1 & 1 & | & 1 \\ 0 & -4 & | & 2 \end{bmatrix}$

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