

## SOLUTION TO HW 9

$$(a) \int x^3 - 6x^2 + 1 \, dx = \frac{x^4}{4} - \frac{6x^3}{3} + x + C = \frac{x^4}{4} - 2x^3 + x + C$$

$$(b) \begin{cases} \frac{dy}{dx} = x^3 - 6x^2 + 1 & \Rightarrow y(x) = \frac{x^4}{4} - 2x^3 + x + C \quad (\text{General Solution}) \\ y(0) = 1 & \Rightarrow 1 = y(0) = \frac{0^4}{4} - 2 \cdot 0^3 + 0 + C \\ & \Rightarrow C = 1 \end{cases}$$

$$\Rightarrow \boxed{y(x) = \frac{x^4}{4} - 2x^3 + x + 1} \quad (\text{Particular Solution})$$