

CALC 4

9. $\frac{dy}{dx} = (1-2x)y^2$ INITIAL CONDITION

$$\rightarrow \int \frac{1}{y^2} dy = \int 1-2x dx$$

$$\rightarrow \frac{-1}{y} = x - x^2 + K \quad \Rightarrow y(0) = -\frac{1}{6}$$

$$\rightarrow y = (x^2 - x - K)^{-1}$$

$$\rightarrow y = \frac{1}{x^2 - x - K} \quad \left| \quad \frac{-1}{6} = \frac{1}{0-0-K} \Rightarrow K = 6 \right.$$

$$\rightarrow y = \frac{1}{x^2 - x - 6}$$

\rightarrow SOLUTION IS DEFINED AS LONG AS

$$x^2 - x - 6 \neq 0$$

$$\rightarrow x^2 - x + \frac{1}{4} - 6 - \frac{1}{4} = 0$$

$$\rightarrow \left(x - \frac{1}{2}\right)^2 - \frac{25}{4} = 0$$

$$\rightarrow x = \frac{1}{2} \pm \frac{5}{2}$$

\rightarrow SOLUTION DEFINED FOR
 $(-\infty, -2) \cup (-2, 3) \cup (3, \infty)$