SECTION 10.3 SEPARABLE DIFFERENTIAL EQUATIONS

- A differential equation is separable if it can be expressed as a function in terms of x times a function in terms of y. Then it is possible to get all y's on one side and all x's on the other side.

- Example: Solve $\dfrac{dy}{dx} = \dfrac{x}{y}$, y(2) = 4

Step 1: Cross Multiply

Step 2: Integrate each side

Step 3: Find C

Step 4: Solve for y if possible.

SOLVE $\dfrac{dx}{dy} = y$

SOLVE $y' = x^2 y$, Y(0) = -2

SOLVE $\dfrac{dy}{dx} = 0.05y$

Hint: Leave coefficients on the right side with dx.

SOLVE $y' = x^2(1-y)$

ARE THEY SEPARABLE? IF SO, SEPARATE THEM.

1. $y' = \dfrac{x}{\sqrt{y}}$

2. $y' = x + y$

3. $y' = \ln(xy)$

4. $y' = e^{x+2y}$

5. $y' = \ln x^y$

6. $y' = \sin x^y$

7. $y' = \dfrac{\ln x + x}{\ln y + y}$

8. $y' = y \sin x + xy$

9. $y' = \dfrac{xy + y}{2x - 3xy}$

10. $y' = xy - 2x + y - 2$