

Name: Solution Section # _____ Ser. # _____

1. Solve the following DE:

$$\frac{dy}{dx} = \frac{xy + 3x - y - 3}{xy - 2x + 4y - 8}$$

$$\frac{dy}{dx} = \frac{x(y+3) - (y+3)}{x(y-2) + 4(y-2)}$$

$$\frac{dy}{dx} = \frac{(x-1)(y+3)}{(x+4)(y-2)}$$

$$(x-1)(y+3) dx = (x+4)(y-2) dy$$

$$\frac{x-1}{x+4} dx = \frac{y-2}{y+3} dy$$

$$\left(1 - \frac{5}{x+4}\right) dx = \left(1 - \frac{5}{y+3}\right) dy$$

$$x - 5 \ln|x+4| + C_1 = y - 5 \ln|y+3|$$

$$x - y + C_1 = 5 \ln|x+4| - 5 \ln|y+3|$$

$$= 5 \ln \left| \frac{x+4}{y+3} \right|$$

$$= \ln \left| \frac{x+4}{y+3} \right|^5$$

$$e^{x-y+C_1} = \left| \frac{x+4}{y+3} \right|^5$$

$$\left(\frac{x+4}{y+3} \right)^5 = C e^{x-y}$$