MON 03-06-06

E.C.

1. $5[2-7(1-3x)]+4=1-3(6-x)$

$5[2-7+21x]+4=1-18+3x$

$10-35+105x+4=-17+3x$

$-21+105x=-17+3x$
$\quad -3x \qquad\qquad -3x$

$102x-21=-17$
$\quad +21 \qquad +21$

$\frac{102x}{102}=\frac{4}{102}$

$x=\frac{2}{51}$

② $a = 2^{nd}\angle$ $74\frac{2}{3}$

$4 + a = \text{First}\angle$ $78\frac{2}{3}$

$4 + a - 52 = 3^{rd}\angle$ $26\frac{2}{3}$

$a - 48$

$\underline{a} + 4 + \underline{a} + \underline{a} - 48 = 180$

$3a - 44 = 180$

$+44 \quad +44$

$$\frac{3a}{3} = \frac{224}{3}$$

$a = 74\frac{2}{3}$

MON 03-06-06

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AP LOVELY LAVENDER: (P.71-76)

1 E 3 A 8 B 9 A 16 C

SOLVING DIFFERENTIAL EQUATIONS BY SEPARATION OF VARIABLES

$$y' = 2x^2y - x^2 + 6y - 3;$$

SOLVE FOR y

$$y' = x^2(2y-1) + 3(2y-1)$$

$$y' = (2y-1)(x^2+3)$$

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

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

NOTE: SOLN TAKES 5 PAGES

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

NEXT PAGE

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

$$u = 2y-1$$

$$\frac{du}{dy} = 2$$

$$\frac{du}{2} = dy$$

$$\int \frac{1}{u} \cdot \frac{du}{2} = \frac{1}{3}x^3 + 3x + C_1$$

$$\frac{1}{2}\int \frac{1}{u}\,du = \frac{1}{3}x^3 + 3x + C_1$$

$$\frac{1}{2} \cdot \ln|u| + C_2 = \frac{1}{3}x^3 + 3x + C_1$$

$$\frac{1}{2}\ln|2y-1| + C_2 = \frac{1}{3}x^3 + 3x + C_1$$

$$\frac{1}{2}\ln|2y-1| + C_2 = \frac{1}{3}x^3 + 3x + C_1$$

WHERE $C_3 = C_1 - C_2$

$$\frac{1}{2}\ln|2y-1| = \frac{1}{3}x^3 + 3x + C_3$$

WHERE $C_4 = 2C_3$

$$\ln|2y-1| = \frac{2}{3}x^3 + 6x + C_4$$

"IMPLICIT SOLUTION"

$$\log_e|2y-1| = \frac{2}{3}x^3 + 6x + C_4$$

$$|2y-1| = e^{\frac{2}{3}x^3 + 6x + C_4}$$

$$2y-1 = e^{\frac{2}{3}x^3 + 6x + C_4}$$

OR

$$2y-1 = -e^{\frac{2}{3}x^3 + 6x + C_4}$$

$$2y-1 = e^{\frac{2}{3}x^3+6x+C_4}$$

$$2y = e^{\frac{2}{3}x^3+6x+C_4} + 1$$

$$y = \frac{e^{\frac{2}{3}x^3+6x+C_4} + 1}{2}$$

$$y = \frac{e^{\frac{2}{3}x^3+6x} \cdot e^{C_4} + 1}{2}$$

CONSTANT. CALL IT A

$$\boxed{y = \frac{A \cdot e^{\frac{2}{3}x^3+6x} + 1}{2}}$$

1 OF 2 EXPLICIT SOLNS

$$2y-1=-e^{\frac{2}{3}x^3+6x+C_4}$$

$$2y=-e^{\frac{2}{3}x^3+6x+C_4}+1$$

$$y=\frac{-e^{\frac{2}{3}x^3+6x+C_4}+1}{2}$$

$$y=\frac{-e^{\frac{2}{3}x^3+6x}\cdot e^{C_4}+1}{2}\qquad C_4\to A$$

$$y=\frac{-Ae^{\frac{2}{3}x^3+6x}+1}{2}$$

2nd EXPLICIT SOLN.

Ex) SOLVE FOR y: $y' = e^{2x+y}$

SOLN:

TO "SEPARATE"

$$\frac{dy}{dx} = e^{2x} \cdot e^{y}$$

$$dy = e^{2x} \cdot e^{y} \cdot dx$$

$$\frac{dy}{e^{y}} = e^{2x} dx$$

$$e^{-y} dy = e^{2x} dx$$

$$\int e^{-y} dy = \int e^{2x} dx$$

$u_1 = -y$ $\qquad$ $u_2 = 2x$

$\frac{du_1}{dy} = -1$ $\qquad$ $\frac{du_2}{dx} = 2$

$\qquad$ $du_2 = 2dx$

$-du_1 = dy$ $\qquad$ $\frac{du_2}{2} = dx$

$$\int e^{-y}\,dy = \int e^{2x}\,dx$$

$$-du_1 = dy \qquad \frac{du_2}{2} = dx$$

$$\int e^{u_1} \cdot -du_1 = \int e^{u_2} \cdot \frac{du_2}{2}$$

$$-\int e^{u_1} du_1 = \frac{1}{2}\int e^{u_2} \cdot du_2$$

$$-e^{u_1} + C_1 = \frac{1}{2} \cdot e^{u_2} + C_2 \qquad C_3 = C_2 - C_1$$

$$-e^{u_1} = \frac{1}{2} \cdot e^{u_2} + C_3$$

$$e^{u_1} = -\frac{1}{2} e^{u_2} + C_4 \qquad C_4 = -C_3$$

$$\underline{\underline{e^{-y} = -\frac{1}{2} e^{2x} + C_4}}$$

IMPLICIT SOLN.

NOW... EXPLICIT SOLN...

$$e^{-y} = -\frac{1}{2}e^{2x} + C_4$$

IMPLICIT SOLN.

$$\ln e^{-y} = \ln\left(-\frac{1}{2}e^{2x} + C_4\right)$$

$$-y \cdot \cancel{\ln e} = \ln\left(-\frac{1}{2}e^{2x} + C_4\right)$$

$$y = -\ln\left(-\frac{1}{2}e^{2x} + C\right)$$

EXPLICIT SOLN.

$C = C_4$

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O.T.L.

p. 322-3

39, 41, 42, 44, 45a, b

AP. p. 72-3 13, 19, 25, 76, 78

BRING? (2 DAYS' WORTH)