

① Given that $\begin{vmatrix} a & b \\ c & d \end{vmatrix} = ad - bc$, find $\begin{vmatrix} 2 & -3 \\ 4 & 5 \end{vmatrix}$

$$10 - (-12)$$

$$22$$

② Solve $2x - 3y = 4 \implies 10x - 15y = 20$

$$4x + 5y = 3 \implies \underline{12x + 15y = 9}$$

$$22x = 29$$

$$x = \frac{29}{22}$$

$$x = \frac{\begin{vmatrix} 4 & -3 \\ 3 & 5 \end{vmatrix}}{\begin{vmatrix} 2 & -3 \\ 4 & 5 \end{vmatrix}} = \frac{20 - (-9)}{10 - (-12)} = \frac{29}{22}$$

$$y = \frac{\begin{vmatrix} 2 & 4 \\ 4 & 3 \end{vmatrix}}{\begin{vmatrix} 2 & -3 \\ 4 & 5 \end{vmatrix}} = \frac{6 - 16}{22} = -\frac{10}{22} = -\frac{5}{11}$$

$$3A - 5B = 2$$

$$5A + 3B = 0$$

$$72C_1 + C_3 = -3456$$

$$24C_1 + C_3 = -864$$

$$1 = C_1 + C_2 - \frac{1}{9}$$

$$1 = -C_1 - 3C_2 + \frac{1}{3}$$

$$A = \frac{\begin{vmatrix} 2 & -5 \\ 0 & 3 \end{vmatrix}}{\begin{vmatrix} 3 & -5 \\ 5 & 3 \end{vmatrix}} = \frac{6}{34}$$

$$B = \frac{\begin{vmatrix} 3 & 2 \\ 5 & 0 \end{vmatrix}}{\begin{vmatrix} 3 & -5 \\ 5 & 3 \end{vmatrix}} = \frac{-10}{34}$$

Example 1.7(d) Is $y = C \cos \frac{2}{3}x$ a sol
 to $y'' + \frac{4}{9}y = 0$, $\left\{ \begin{array}{l} y'(0) = 0, y'(3\pi) = 0 \end{array} \right.$

$$y'' + \frac{4}{9}y = -\frac{4}{9}C \cos \frac{2}{3}x + \frac{4}{9}C \cos \frac{2}{3}x = 0$$

Yes, $y = C \cos \frac{2}{3}x$ is a sol to the IVP.

$$y' = -\frac{2}{3}C \sin \frac{2}{3}x$$

$$0 \stackrel{?}{=} -\frac{2}{3}C \sin \frac{2}{3}(3\pi) \text{ true}$$

$$\Rightarrow y'' = -\frac{4}{9}C \cos \frac{2}{3}x$$

Due Wed: 5.1:5, 2.3:8, 4(a)

Due Fri: 4.2:1 both parts

Solve $\frac{d^4 y}{dx^4} = 24$,

$$y(0) = y(10) = y''(0) = y''(10) = 0$$

$$y^{(4)} = 20$$

$$y''' = 20x + C_1$$

$$y'' = 10x^2 + C_1x + C_2 \rightarrow 0$$

$$\vdots + \frac{1}{2}C_1x^2$$

$$y(0) = y(8) = y'(0) = y'(8) = 0$$