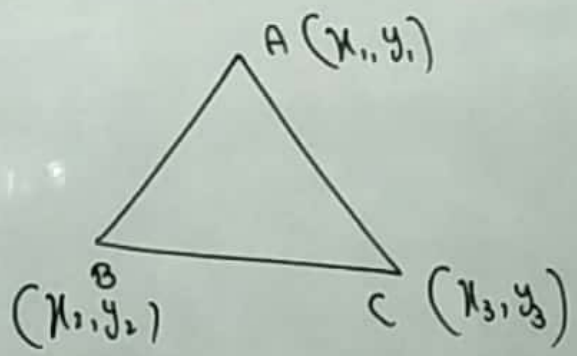
Cordinate

Area of Triangle



Condⁿ - Three Points Collinear.

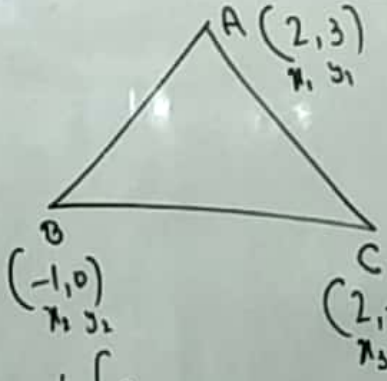
$A = 0$

$$A = \frac{1}{2}\left[x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)\right]$$

$$\vec{A} = \frac{1}{2}\left[x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)\right]$$

Ex 7.3

Q7



$$A = \frac{1}{2}\left[x_1(y_2-y_3) + x_2(y_3-y_1) + x_3(y_1-y_2)\right]$$

$$= \frac{1}{2}\left[2(0+4) - 1(-4-3) + 2(3-0)\right]$$

$$= \frac{1}{2}(8+7+6)$$

$$= \frac{21}{2} \text{ Ans}$$

Short cut

$$A = \frac{1}{2}\left|\begin{matrix} 2 & 3 \\ -1 & 0 \\ 2 & -4 \\ 2 & 3 \end{matrix}\right|$$

$$A = \frac{1}{2}\left[\begin{matrix} (0+4+6) \\ -(-3+0-8) \end{matrix}\right]$$

$$= \frac{1}{2}(10+11) = \frac{21}{2}$$

2(i) $(7,-2)$ $(5,1)$ $(3,k)$ Collinear

$$A = 0$$

$$\frac{1}{2}\begin{vmatrix} 7 & -2 \\ 5 & 1 \\ 3 & k \\ 7 & -2 \end{vmatrix} = 0$$

$$\therefore (7+5k-6) - \begin{pmatrix} -10 \\ +3 \\ +7k \end{pmatrix} = 0$$

$$5k+1+7-7k = 0$$

$$-2k+8 = 0$$

$$+2k = +8$$

$$\boxed{k = 4}$$

2(i) $(7,-2)$ $(5,1)$ $(3,k)$ Collinear

$$A = 0$$

$$\frac{1}{2}\begin{vmatrix} 7 & -2 \\ 5 & 1 \\ 3 & k \\ 7 & -2 \end{vmatrix} = 0$$

$$\Rightarrow (7+5k-6) - \begin{pmatrix} -10 \\ +3 \\ +7k \end{pmatrix} = 0$$

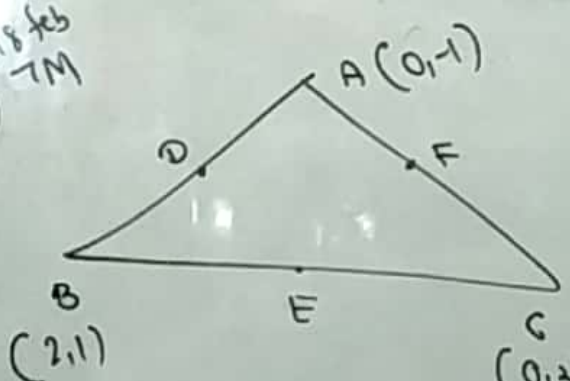
$$5k+1+7-7k = 0$$

$$-2k+8=0$$

$$+2k=+8$$

$$\boxed{k=4}$$

③ 2018 Feb TM



$D = \left(\frac{2+0}{2}, \frac{1-1}{2}\right) = (1, 0)$

$E = \left(\frac{2+0}{2}, \frac{1+3}{2}\right) = (1, 2)$

$F = \left(\frac{0+0}{2}, \frac{3-1}{2}\right) = (0, 1)$

Area of ΔDEF

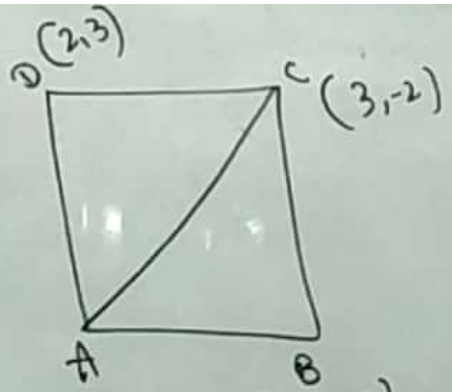
$$A_1 = \frac{1}{2}\begin{vmatrix} 1 & 0 \\ 1 & 2 \\ 0 & 1 \\ 1 & 0 \end{vmatrix} = 1$$

Area of ΔABC

$$A_2 = \frac{1}{2}\begin{vmatrix} 0 & -1 \\ 2 & 1 \\ 0 & 3 \\ 0 & -1 \end{vmatrix} = 4$$

$$\frac{A_1}{A_2} = \frac{1}{4} = 1:4$$ Ans

(4)



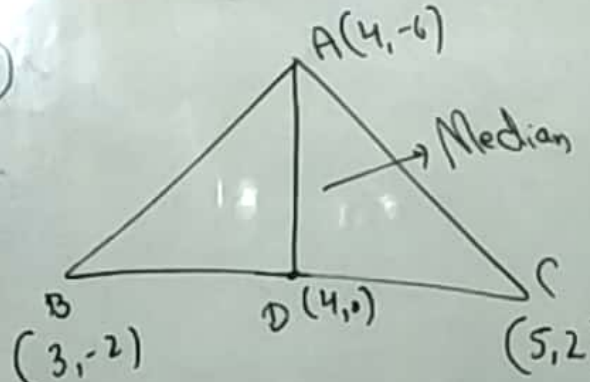
Area(ADC)

$$A_2 = \frac{1}{2}\begin{vmatrix} -4 & -2 \\ 2 & 3 \\ 3 & -2 \\ -4 & -2 \end{vmatrix}$$

$$A = A_1 + A_2$$

$$\text{Ar}(ABC) = A_1 = \frac{1}{2}\begin{vmatrix} -4 & -2 \\ -3 & -5 \\ 3 & -2 \\ -4 & -2 \end{vmatrix}$$

(15)



$$① = \left(\frac{3+5}{2}, \frac{-2+2}{2}\right)$$

$$= (4, 0)$$

Area (ABD)

$$A_1 = \frac{1}{2}\begin{vmatrix} 4 & -6 \\ 3 & -2 \\ 4 & 0 \\ 4 & -6 \end{vmatrix}$$

Area (ADC)

$$A_2 = \frac{1}{2}\begin{vmatrix} 4 & -6 \\ 4 & 0 \\ 5 & 2 \\ 4 & -6 \end{vmatrix}$$

$$A_1 = A_2$$