

$$\begin{aligned}
 1 \text{ (i)} \quad & A(2,3), B(-1,0), C(2,-4) \\
 & \text{ar}(\Delta ABC) \\
 &= \frac{1}{2} |2(0+4) + (-1)(-4-3) + 2(3-0)| \\
 &= \frac{1}{2} |2 \times 4 - 1(-7) + 2 \times 3| \\
 &= \frac{1}{2} |8 + 7 + 6| \\
 &= \frac{21}{2} \text{ sq. units}
 \end{aligned}$$

$$\begin{aligned}
 1 \text{ (ii)} \quad & A(-5,-1), B(3,-5), C(5,2) \\
 & \text{ar}(\Delta ABC)
 \end{aligned}$$

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

$$= \frac{1}{2} |(-5)(-5) - 3(-1) + 3 \times 2 - 5(-5) + 5(-1) - (-5) \times 2|$$

$$= \frac{1}{2} |25 + 3 + 6 + 25 - 5 + 10|$$

$$= \frac{1}{2} \times 64$$

$$= 32 \text{ sq. units}$$

$$\begin{aligned}
 2 \text{ (i)} \quad & A(7,2), B(5,1), C(3,k) \\
 & \text{Pts } A, B, C \text{ are collinear} \\
 & \therefore \text{ar}(\Delta ABC) = 0
 \end{aligned}$$

$$\frac{1}{2} [7(1-k) + 5(k+2) + 3(-2-1)] = 0$$

$$7 - 7k + 5k + 10 - 9 = 0$$

$$\Rightarrow -2k = -8$$

$$\Rightarrow k = \frac{-8}{-2}$$

$$\Rightarrow k = 4$$

$$\begin{aligned}
 2 \text{ (ii)} \quad & A(8,1), B(k,-4), C(2,-5) \\
 & \text{Pts } A, B, C \text{ are collinear} \\
 & \therefore \text{ar}(\Delta ABC) = 0
 \end{aligned}$$

$$\frac{1}{2} [8(-4+5) + k(-5-1) + 2(1+4)] = 0$$

$$\Rightarrow 8 \times 1 + k(-6) + 2 \times 5 = 0$$

$$\Rightarrow 8 - 6k + 10 = 0$$

$$\Rightarrow -6k = -18$$

$$\Rightarrow k = \frac{-18}{-6}$$

$$\Rightarrow k = 3$$