



#### Chapter Determinants Ex 6.3 Q4

If the given points are collinear, then the area of the triangle must be zero.

Hence

$$\frac{1}{2} \begin{vmatrix} a & b & 1 \\ a' & b' & 1 \\ a-a' & b-b' & 1 \end{vmatrix} = 0$$

or

$$\frac{1}{2} [a(b'-b+b') - b(a'-a+a') + 1(a'b - a'b' - ab' + a'b')] = 0$$

$$\text{or } \frac{1}{2} [ab' - ab + ab' - a'b + ab - a'b + a'b - ab'] = 0$$

$$\text{or } ab' - a'b = 0$$

$$ab' = a'b$$

Hence proved

#### Chapter Determinants Ex 6.3 Q5

If the points are collinear, then the area of the triangle must be zero.

Hence

$$\begin{vmatrix} 1 & -5 & 1 \\ -4 & 5 & 1 \\ \lambda & 7 & 1 \end{vmatrix} = 0$$

Expanding along  $R_1$

$$1(-2) + 5(-4 - \lambda) + 1(-28 - 5\lambda) = 0$$

$$-2 - 20 - 5\lambda - 28 - 5\lambda = 0$$

$$-50 - 10\lambda = 0$$

$$\lambda = -5$$

Hence  $\lambda = -5$

#### Chapter Determinants Ex 6.3 Q6

$$\text{Area} = \left| \frac{1}{2} \begin{vmatrix} x & 4 & 1 \\ 2 & -6 & 1 \\ 5 & 4 & 1 \end{vmatrix} \right|$$

$$\pm 2 \times 35 = \begin{vmatrix} x & 4 & 1 \\ 2 & -6 & 1 \\ 5 & 4 & 1 \end{vmatrix}$$

$$\pm 70 = x(-10) - 4(-3) + 1(38)$$

$$\pm 70 = -10x + 12 + 38$$

$$\pm 70 = -10x + 50 \quad \text{--- (1)}$$

Taking (+) sign

$$+70 = -10x + 50$$

$$10x = -20 \text{ or } x = -2$$

Again taking (-) sign

$$-70 = -10x + 50$$

$$10x = 120 \text{ or } x = 12$$

Hence  $x = -2, 12$

#### Chapter Determinants Ex 6.3 Q7

$$\begin{aligned}
 \text{Area} &= \frac{1}{2} \begin{vmatrix} 1 & 4 & 1 \\ 2 & 3 & 1 \\ -5 & -3 & 1 \end{vmatrix} \\
 &= \frac{1}{2} [1(6) - 4(7) + 1(-6 + 15)] \\
 &= \frac{1}{2} [6 - 28 + 9] \\
 &= \frac{1}{2} [-13] \\
 &= \frac{13}{2} \text{ sq. units} \quad [\because \text{Area can not be negative}]
 \end{aligned}$$

Also, since the area of the triangle is non-zero.

Hence these points are non-collinear.

Chapter Determinants Ex 6.3 Q8

$$\begin{aligned}
 \text{Area} &= \frac{1}{2} \begin{vmatrix} -3 & 5 & 1 \\ 3 & -6 & 1 \\ 7 & 2 & 1 \end{vmatrix} \\
 &= \frac{1}{2} [-3(-8) - 5(-4) + 1(48)] \\
 &= \frac{1}{2} [24 + 20 + 48] \\
 &= 46 \text{ sq. units}
 \end{aligned}$$

Hence the area is 46 sq. units.

\*\*\*\*\*END\*\*\*\*\*