Chapter Determinants Ex 6.3 Q2(i)

If 3 points are collinear, then the area of the triangle then form will be zero.

Hence

$$\frac{1}{2}\begin{vmatrix} 5 & 5 & 1 \\ -5 & 1 & 1 \\ 10 & 7 & 1 \end{vmatrix} = 0$$

Expanding along R_1

$= \frac{1}{2}\left[5(-6) - 5(-15) + 1(-35 - 10)\right]$

$= \frac{1}{2}\left[-35 + 75 - 45\right]$

$= \frac{1}{2}[0]$

$= 0$

Since the area of the triangle is zero, hence the points are collinear.

Chapter Determinants Ex 6.3 Q2(ii)

If 3 points are collinear, then the area of the triangle then form will be zero.

Hence

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

Expanding along R_1

$= \frac{1}{2}\left[1(-4) + 1(-2) + 1(6)\right]$

$= 0$

Since the area of the triangle is zero, hence the points are collinear.

Chapter Determinants Ex 6.3 Q2(iii)

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

So

$$\frac{1}{2}\begin{vmatrix} 3 & -2 & 1 \\ 8 & 8 & 1 \\ 5 & 2 & 1 \end{vmatrix} = 0$$

L.H.S

Expanding along R_1

$= \frac{1}{2}\left[3(6) + 2(3) + 1(-24)\right]$

$= \frac{1}{2}\left[18 + 6 - 24\right]$

$= \frac{1}{2}[0]$

$= 0$

Since the area of the triangle is zero, hence given points are collinear.

Chapter Determinants Ex 6.3 Q2(iv)

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

Hence

$$= \frac{1}{2}\begin{vmatrix} 2 & 3 & 1 \\ -1 & -2 & 1 \\ 5 & 8 & 1 \end{vmatrix}$$

$$= \frac{1}{2}\left[2(-10) - 3(-6) + 1(2)\right]$$

$$= \frac{1}{2}\left[-20 + 18 + 2\right]$$

$$= \frac{1}{2}\left[0\right]$$

$$= 0$$

Hence the given points are collinear.

Chapter Determinants Ex 6.3 Q3

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

Hence

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

Expanding along R_1

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

$$or\ ab - a - 0 - b = 0$$

$$or\ ab = a + b$$

Hence proved

*********** END **********