# COORDINATE GEOMETRY(II)

Form 6
Vol 5

**Part 1 – Transformation**

1. A

2. C

3. A

4. D

5. Reflection about *y*-axis, then translate 1 unit to the right, finally reflect about *x*-axis.

6. (a) Reflection about *y*-axis and the reflection about *x*-axis.
   (b) $(-5,5)$
   (c) $x^3-26x$

7. Reflection along the *x*-axis, reduce $\frac{1}{3}$ along the *y*-axis, then translate $\frac{1}{2}$ units to the right and $\frac{145}{12}$ units upwards.

8. (a)

$$f(x)=\frac{1}{k+3}\left[x^2-(2k+2)x\right]+\frac{1-k}{k+3}$$
$$=\frac{1}{k+3}[x^2-(2k+2)x+(k+1)^2-(k+1)^2]+\frac{1-k}{k+3}$$
$$=\frac{1}{k+3}(x-(k+1))^2-\frac{(k+1)^2}{k+3}+\frac{1-k}{k+3}$$
$$=\frac{1}{k+3}(x-(k+1))^2+\frac{1-k-k^2-2k-1}{k+3}$$
$$=\frac{1}{k+3}(x-(k+1))^2+\frac{-k^2-3k}{k+3}$$
$$=\frac{1}{k+3}(x-(k+1))^2-k$$

$\therefore U=(k+1,-k)$

(b) Let $X=(a,0)$ be the circumcenter.

$V=(k+1,k+3)$

Note that $VX \perp OU$

$$\frac{k+3}{k+1-a}\times\frac{0+k}{0-(k+1)}=-1$$

$$\frac{k+3}{k+1-a}\times\frac{k}{k+1}=1$$

$$\frac{k+3}{k+1-a}=\frac{k+1}{k}$$

$$k^2+3k=(k+1)^2-a(k+1)$$

$$k^2+3k=k^2+2k+1-a(k+1)$$

$$a=\frac{1-k}{k+1}$$

$$\text{Orthocentre}=(\frac{1-k}{k+1},0)$$