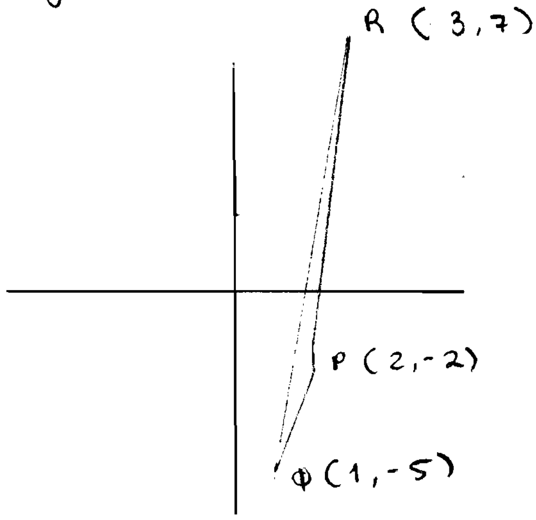
Valeria Anaya Aguilar 12/11/12

Problema 1:



$$\begin{pmatrix} \tilde{x} \\ \hat{y} \end{pmatrix} = \begin{pmatrix} 9 & 0 \\ 0 & 2/5 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix}$$

→ R = (3, 7)

$$\begin{pmatrix} \hat{x} \\ \hat{y} \end{pmatrix} \begin{pmatrix} 9 & 0 \\ 0 & 2/5 \end{pmatrix} \begin{pmatrix} 3 \\ 7 \end{pmatrix} = \begin{pmatrix} 27 & 0 \\ 0 & 14/5 \end{pmatrix} = (27, 14/5)$$

→ P = (2, -2)

$$\begin{pmatrix} \hat{x} \\ \hat{y} \end{pmatrix} \begin{pmatrix} 9 & 0 \\ 0 & 2/5 \end{pmatrix} \begin{pmatrix} 2 \\ -2 \end{pmatrix} = \begin{pmatrix} 18 & 0 \\ 0 & -4/5 \end{pmatrix} = (18, -4/5)$$

→ Φ = (1, -5)

$$\begin{pmatrix} \hat{x} \\ \hat{y} \end{pmatrix} \begin{pmatrix} 9 & 0 \\ 0 & 2/5 \end{pmatrix} \begin{pmatrix} 1 \\ -5 \end{pmatrix} = \begin{pmatrix} 9 & 0 \\ 0 & -2 \end{pmatrix} = (9, -2)$$

- Vértice R

$\tilde{x} = 27 + 0 = 27$
$\hat{y} = 0 + 14/5 = 14/5$

Coordenadas
(27, 14/5)

- Vértice P

$\tilde{x} = 18 + 0 = 18$
$\tilde{y} = 0 - 4/5 = -4/5$

(18, -4/5)

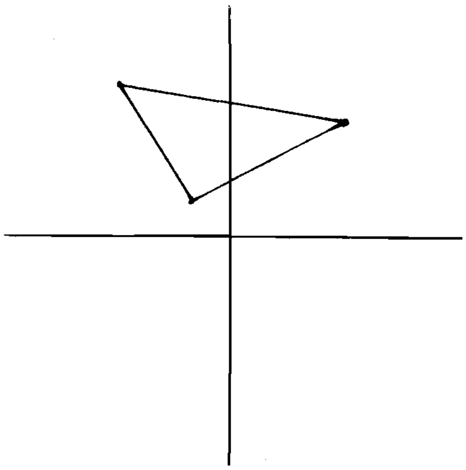
- Vértice Φ

$\tilde{x} = 9 + 0 = 9$
$\tilde{y} = 0 - 2 = -2$

(9, -2)

- El nuevo Δ se traslado, se roto y alargo al que teníamos

Problema 2:



$A = \begin{pmatrix} -4 & 8 \\ 2 & -3 \end{pmatrix}$

$\rightarrow P_0\ (-3,4)$

$\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -4 & 8 \\ 2 & -3 \end{pmatrix}\begin{pmatrix} -3 \\ 4 \end{pmatrix} = \begin{pmatrix} 12 & 32 \\ -6 & -12 \end{pmatrix}$

$x = 12 + 32 = 42$ $\quad (x,y) = (44,-18)$
$y = -6 - 12 = -18$

$\rightarrow P_1\ (3,3)$

$\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -4 & 8 \\ 2 & -3 \end{pmatrix}\begin{pmatrix} 3 \\ 3 \end{pmatrix} = \begin{pmatrix} -12 & 24 \\ 6 & -9 \end{pmatrix}$

$x = -12 + 24 = 12$ $\quad (x,y) = (12,-3)$
$y = 6 - 9 = -3$

$\rightarrow P_2\ (-1,1)$

$\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -4 & 8 \\ 2 & -3 \end{pmatrix}\begin{pmatrix} -1 \\ 1 \end{pmatrix} = \begin{pmatrix} 4 & 8 \\ -2 & -3 \end{pmatrix}$

$x = 4 + 8 = 12$ $\quad (x,y) = (12,-5)$
$y = -2 - 3 = -5$

Área:

Por fórmula de Heron

$S = \sqrt{s(s-a)(s-b)(s-c)}$

$s = \frac{a+b+c}{2}$

$a = \sqrt{(12-44)^2 + (-18+3)^2} = \underline{35.34}$

$b = \sqrt{(12-12)^2 + (-3+5)^2} = \underline{2}$

$c = \sqrt{(12-44)^2 + (-5+18)^2} = \underline{34.53}$

$$S = \frac{a+b+c}{2}$$

$$S = \frac{35.34 + 2 + 34.53}{2} = \underline{35.93}$$

$$A = \sqrt{(35.93)(35.93-35.34)(35.93-2)(35.93-34.53)}$$

(2) $\boxed{A = 31.73}$

→ Determinante de A

$$|A| = \begin{pmatrix} -4 & 8 \\ 2 & -3 \end{pmatrix} = 12 - 16 = -4 = 4$$

→ área original

$a = \sqrt{(-3-3)^2 + (4-3)^2} = \underline{6.08}$

$b = \sqrt{(3+1)^2 + (3-1)^2} = \underline{4.47}$

$c = \sqrt{(-1+3)^2 + (1-4)^2} = \underline{3.60}$

$$S = \frac{6.08 + 4.47 + 3.60}{2} = \underline{7.07}$$

$$A = \sqrt{(7.07)(7.07-6.08)(7.07-4.47)(7.07-3.60)}$$

(1) $\boxed{A = 7.94}$

Si podemos por que si dividimos el determinante entre el área del $\Delta(1)$, se obtiene el del (2) y si multiplicamos el determinante por el $\Delta(2)$ nos da el area del $\Delta(1)$

Problema 3:

$$A = \begin{pmatrix} 4 & 3 \\ -2 & 1 \end{pmatrix} \qquad B = \begin{pmatrix} 3 & 4 \\ 4 & -2 \end{pmatrix}$$

$$A^{-1} = \begin{pmatrix} x & y \\ z & w \end{pmatrix}$$

$$AA^{-1} = I$$

$$AA^{-1} = \begin{pmatrix} 4 & 3 \\ -2 & 1 \end{pmatrix} \begin{pmatrix} x & y \\ z & w \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$$

$$= \begin{pmatrix} 4x+3z & 4y+3w \\ -2x+z & -2y+w \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$$

$$\begin{aligned} 4x+3z &= 1 \\ -2x+z &= 0 \\ 4y+3w &= 0 \\ -2y+w &= 1 \end{aligned}$$

$$x\begin{pmatrix} 4 \\ -2 \end{pmatrix} + z\begin{pmatrix} 3 \\ 1 \end{pmatrix} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$y\begin{pmatrix} 4 \\ -2 \end{pmatrix} + w\begin{pmatrix} 3 \\ 1 \end{pmatrix} = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$

$$x = \frac{d}{ad-bc} = \frac{1}{4+6} = \frac{1}{10} \qquad z = \frac{-c}{ad-bc} = \frac{2}{4+6} = \frac{2}{10} = \frac{1}{5}$$

$$y = \frac{-b}{ad-bc} = \frac{3}{4+6} = \frac{3}{10} \qquad w = \frac{a}{ad-bc} = \frac{4}{4+6} = \frac{4}{10}$$

$$A^{-1} = \frac{1}{ad-bc}\begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$$

$$A^{-1} = \frac{1}{10}\begin{pmatrix} 1 & -3 \\ 2 & 4 \end{pmatrix}$$

$$A = \begin{pmatrix} \frac{d}{ad-bc} & \frac{-b}{ad-bc} \\ \frac{-c}{ad-bc} & \frac{a}{ad-bc} \end{pmatrix}$$

$$B = \begin{pmatrix} 3 & 4 \\ 4 & -2 \end{pmatrix}$$

$$B^{-1} = \frac{1}{-6-16} \begin{pmatrix} -2 & -4 \\ -4 & 3 \end{pmatrix} = \frac{1}{-22} \begin{pmatrix} -2 & -4 \\ -4 & 3 \end{pmatrix}$$