$$(1)\qquad \begin{pmatrix} 1 & 1 \\ 2x & 2y \end{pmatrix}, \begin{pmatrix} 1 & 1 \\ 2u & 2v \end{pmatrix}. \quad \therefore \begin{pmatrix} \frac{x-v}{v-u} & \frac{y-v}{v-u} \\ -\frac{x-u}{v-u} & -\frac{y-u}{v-u} \end{pmatrix}$$

$$(2)\qquad \begin{pmatrix} 2x & 2y \\ 2ux+v^2 & 2vy+u^2 \end{pmatrix}, \begin{pmatrix} 2u & 2v \\ 2uy+x^2 & y^2+2vx \end{pmatrix}$$

$$\therefore \begin{pmatrix} -\frac{x\,y^2+2v\,x^2-2uvx-v^3}{u\,y^2-2uvy-v\,x^2+2uvx} & -\frac{y^3+(2vx-2v^2)y-u^2v}{u\,y^2-2uvy-v\,x^2+2uvx} \\ \frac{2uxy+x^3-2u^2x-u\,v^2}{u\,y^2-2uvy-v\,x^2+2uvx} & \frac{2u\,y^2+(x^2-2uv)y-u^3}{u\,y^2-2uvy-v\,x^2+2uvx} \end{pmatrix}$$

$$(3)\qquad \begin{pmatrix} u & v \\ 1 & 1 \end{pmatrix}, \begin{pmatrix} x & y \\ 1 & 1 \end{pmatrix}. \quad \therefore \begin{pmatrix} -\frac{y-u}{y-x} & -\frac{y-v}{y-x} \\ \frac{x-u}{y-x} & \frac{x-v}{y-x} \end{pmatrix}.$$

(4)

$$\begin{pmatrix} y+u & x+v \\ (v+u)y & (v+u)x \end{pmatrix}, \begin{pmatrix} x+v & y+u \\ xy+v & xy+u \end{pmatrix}$$

$$\therefore \quad \frac{1}{(x+v)(xy+u)-(y+u)(xy+v)} \begin{pmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{pmatrix}$$

$$a_{11} = (x-v-u)\, y^2 + (ux - uv - u^2 + u)y + u^2$$

$$a_{12} = (x^2 - ux)y + (-uv - u^2 + u)x + uv$$

$$a_{21} = -x\, y^2 + (-vx - v^2 + (1-u)v)y + uv$$

$$a_{22} = -(x^2 + vx)y + (-v-u)\, x^2 + ((1-u)v - v^2)x + v^2$$