

Section 6.4

$$\textcircled{1} \text{ a) } D = 3(4) - 1(2) \\ = 10$$

$$A^{-1} = \frac{1}{D} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix} \\ = \frac{1}{10} \begin{bmatrix} 4 & -1 \\ -2 & 3 \end{bmatrix}$$

$$\text{b) } D = 2(6) - 3(4) \\ = 0$$

A^{-1} does not exist

$$\text{c) } D = 1(2) - (-1)(1) \\ = 3$$

$$A^{-1} = \frac{1}{D} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix} \\ = \frac{1}{3} \begin{bmatrix} 2 & 1 \\ -1 & 1 \end{bmatrix}$$

$$\text{d) } D = 6(9) - (-7)(8) \\ = 110$$

$$A^{-1} = \frac{1}{D} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix} \\ = \frac{1}{110} \begin{bmatrix} 9 & 7 \\ -8 & 6 \end{bmatrix}$$

②

$$A = \begin{bmatrix} 11 & 29 \\ 2 & 7 \end{bmatrix}$$

$$D = 11(7) - 29(2) \\ = 19$$

$$A^{-1} = \frac{1}{D} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix} \\ = \frac{1}{19} \begin{bmatrix} 7 & -29 \\ -2 & 11 \end{bmatrix}$$

$$X = A^{-1}B$$

$$\begin{bmatrix} x \\ y \end{bmatrix} = \frac{1}{19} \begin{bmatrix} 7 & -29 \\ -2 & 11 \end{bmatrix} \begin{bmatrix} 289 \\ 75 \end{bmatrix}$$

$$= \frac{1}{19} \begin{bmatrix} -152 \\ 247 \end{bmatrix} \quad \begin{matrix} 7(289) + (-29)(75) \\ \hline \end{matrix}$$

$$= \begin{bmatrix} -8 \\ 13 \end{bmatrix}$$

$$\boxed{\begin{matrix} x = -8 \\ y = 13 \end{matrix}}$$

(3)

$$A = \begin{bmatrix} -4 & 5 \\ -2 & 3 \end{bmatrix}$$

$$D = -4(3) - 5(-2) \\ = -2$$

$$A^{-1} = \frac{1}{D} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix} \\ = \frac{1}{-2} \begin{bmatrix} 3 & -5 \\ 2 & -4 \end{bmatrix}$$

$$X = A^{-1}B$$

$$\begin{bmatrix} x \\ y \end{bmatrix} = \frac{1}{-2} \begin{bmatrix} 3 & -5 \\ 2 & -4 \end{bmatrix} \begin{bmatrix} 39 \\ 33 \end{bmatrix}$$

$$= \frac{1}{-2} \begin{bmatrix} -48 \\ -54 \end{bmatrix} \quad \overbrace{3(39) + (-5)(33)}$$

$$= \begin{bmatrix} 24 \\ 27 \end{bmatrix}$$

$$\boxed{\begin{matrix} x=24 \\ y=27 \end{matrix}}$$