

## 7.1절 확인문제

01.  $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 8 & 12 \end{bmatrix}$

02.  $2A + 4B = \begin{bmatrix} 12 & 4 \\ 22 & 34 \end{bmatrix}$ ,  $2(A + 2B) = \begin{bmatrix} 12 & 4 \\ 22 & 34 \end{bmatrix}$

03.  $(A + B)^2 = \begin{bmatrix} 25 & 0 \\ 119 & 144 \end{bmatrix}$ ,  $A^2 + 2AB + B^2 = \begin{bmatrix} 11 & -14 \\ 119 & 158 \end{bmatrix}$ , 성립하지 않는다(이유는 생략).

## 7.2절 확인문제

01. (참)

02.  $\det A = 4$ ,  $\det B = -2$

03.  $(ABC)^{-1} = \begin{bmatrix} 7 & -39 \\ -5 & 28 \end{bmatrix}$ ,  $C^{-1}B^{-1}A^{-1} = \begin{bmatrix} 7 & -39 \\ -5 & 28 \end{bmatrix}$

04.  $A^{-1} = \frac{1}{32} \begin{bmatrix} 11 & -6 & 4 \\ -6 & 12 & -8 \\ 4 & 8 & 16 \end{bmatrix}$ ,  $B$ 의 역행렬은 존재하지 않는다.

### 7.3절 확인문제

01. (거짓)

02. (a)  $x_1 = 16, x_2 = 11$                       (b)  $x_1 = 12, x_2 = 14, x_2 = 11$

03. (a) 해는 무수히 많다.                      (b) 해는 존재하지 않는다.

04. (a)  $k \neq 0, 9$  일 때  $x_1 = x_2 = 0$                       (b)  $k = 0, 9$

## 7.4절 확인문제

01. (참)

02. (a)  $x_1 = \frac{29}{8}$ ,  $x_2 = -\frac{25}{8}$ ,  $x_3 = -\frac{19}{8}$

(b)  $x_1 = 2$ ,  $x_2 = 5$ ,  $x_3 = 6$

(c)  $x_1 = 1$ ,  $x_2 = 3$ ,  $x_3 = -2$ ,  $x_4 = 4$

(d)  $x_1 = 2$ ,  $x_2 = 3$ ,  $x_3 = 5$ ,  $x_4 = 7$

## 7.5절 확인문제

01.  $(-9, 5)$

02.  $T(Y) - T(Z) = 6 \begin{bmatrix} 5 \\ 4 \end{bmatrix} = \begin{bmatrix} 30 \\ 24 \end{bmatrix}$

03. (a)  $\begin{bmatrix} 3\sqrt{3}+1 \\ -3+\sqrt{3} \end{bmatrix}$       (b)  $\begin{bmatrix} -\frac{3}{2}-\sqrt{3} \\ -\frac{3\sqrt{3}}{2}+1 \end{bmatrix}$

04.  $\begin{bmatrix} 5 \\ 2 \end{bmatrix}$

05.  $T^{-1}(3, -4) = \begin{bmatrix} -\frac{7}{5} \\ -\frac{17}{5} \end{bmatrix}$

## 7장 연습문제

### 01. 30

```
import numpy as np
A = np.zeros((3,2))

sum = 0
for i in range(1,4):
    for j in range(1,3):
        A[i-1][j-1] = i+2*j # Python은 인덱스가 0부터 시작인 것에 주의!
        sum = sum + A[i-1][j-1]

print("A=", A)
print("sum=", sum)
```

### 02. $x = 6, y = 1$

03. (a)  $\begin{bmatrix} 10 & -19 & 28 \\ 2 & -8 & 14 \end{bmatrix}$       (b)  $\begin{bmatrix} 4 & 5 & 6 \\ 8 & 10 & 12 \\ 12 & 15 & 18 \end{bmatrix}$

```
import numpy as np

# (a)
A = np.array([[1,3,5],
               [3,2,1]])
B = np.array([[ 1,-4, 7],
               [-2, 5,-8],
               [ 3,-6, 9]])
print("AB=",np.dot(A,B))

# (b)
A = np.array([[1],
               [2],
               [3]])
B = np.array([[4,5,6]])
print("AB=",np.dot(A,B))
```

04. (a) (거짓)      (b) (참)      (c) (거짓)

05. (a) 생략      (b)  $A^{2021} = \begin{bmatrix} 1 & 3 \\ -1 & -2 \end{bmatrix}$

```
import sympy as sp

a = sp.Symbol('a')
b = sp.Symbol('b')
c = sp.Symbol('c')
d = sp.Symbol('d')

A = sp.Matrix([[a,b],[c,d]])
I = sp.Matrix([[1,0],[0,1]])

print("A^2-(a+d)A+(ad-bc)I=", sp.simplify(A**2-(a+d)*A+(a*d-b*c)*I))
```

06. 생략

07. (a)  $A^{-1} = \frac{1}{6} \begin{bmatrix} 6-12 & 14 \\ 0 & 3 & -6 \\ 0 & 0 & 2 \end{bmatrix}$       (b)  $B^{-1} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 \\ 0 & 0 & \frac{1}{3} & 0 \\ 0 & 0 & 0 & \frac{1}{4} \end{bmatrix}$

```
import numpy as np

# (a)
A = np.array([[1,3,5],
               [3,2,1]])
B = np.array([[ 1,-4, 7],
               [-2, 5,-8],
               [ 3,-6, 9]])

print("AB=",np.dot(A,B))
```

```
# (b)
A = np.array([[1,
               [2],
               [3]])

B = np.array([[4,5,6]])
print("AB=",np.dot(A,B))
```

08.  $A^{2020} = P^{-1} B^{2020} P$

09.  $k = -1, 9$

10.  $\begin{bmatrix} 2 \\ 7 \end{bmatrix}$

11. 생략

12. 8개

13.  $V\left(\begin{bmatrix} 1 \\ 2 \end{bmatrix}\right) = \begin{bmatrix} -52 \\ -65 \end{bmatrix}$

14. 128

15.  $l : 15x + 11y - 25 = 0$