

DETERMINANTS EXERCISES — FORK1003

RUNAR ILE

1.

Exercise 1.1. Find the determinant of the following matrices (little calculation is required).

$$(a) \begin{bmatrix} 1 & 5 & 8 \\ 40 & -9 & 1 \\ 0 & 0 & 0 \end{bmatrix}$$

$$(b) \begin{bmatrix} 1 & 5 & 8 \\ 40 & -9 & 1 \\ 1 & 5 & 8 \end{bmatrix}$$

$$(c) \begin{bmatrix} 2 & 36 & -9 & 3 \\ 0 & 3 & 1 & 28 \\ 0 & 0 & 2 & 71 \\ 0 & 0 & 0 & 3 \end{bmatrix}$$

$$(d) \begin{bmatrix} 0 & 3 & 1 & 28 \\ 0 & 0 & 0 & 3 \\ 0 & 0 & 2 & 71 \\ 2 & 36 & -9 & 3 \end{bmatrix}$$

$$(e) \begin{bmatrix} 2 & 31 & -7 & 4 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & -1 & 71 \\ 0 & 25 & 0 & -1 \end{bmatrix}$$

$$(f) \begin{bmatrix} 6 & 9 & 6 & 9 \\ 9 & 6 & 9 & 6 \\ 6 & 9 & 6 & 9 \\ 9 & 6 & 9 & 6 \end{bmatrix}$$

$$(g) \begin{bmatrix} 2 & -5 & 9 & 3 \\ 4 & -10 & 18 & 6 \\ 7 & -13 & 16 & 3 \\ 9 & -3 & 0 & 8 \end{bmatrix}$$

$$(h) \begin{bmatrix} 9 & -7 & 2 & 1 \\ -1 & 5 & 4 & 7 \\ 27 & -21 & 6 & 3 \\ 2 & -10 & -8 & -14 \end{bmatrix}$$

$$(i) \begin{bmatrix} 2 & -5 & 9 \\ 5 & -8 & 7 \\ 7 & -13 & 16 \end{bmatrix}$$

$$(j) \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$$

$$(k) \begin{bmatrix} 7 & 0 & 0 & 7 \\ 0 & -2 & 18 & 9 \\ -21 & 0 & 1 & -8 \\ 0 & 0 & 0 & 2 \end{bmatrix}$$

$$(l) \begin{bmatrix} 10 & 8 & 4 & 5 \\ 0 & 3 & 9 & 6 \\ 0 & 0 & 1 & -8 \\ 0 & -9 & -27 & 2 \end{bmatrix}$$

$$(m) \begin{bmatrix} 3 & 0 & 5 \\ 0 & 1 & 0 \\ 1 & 0 & 4 \end{bmatrix}$$

$$(n) \begin{bmatrix} 3 & 0 & 5 \\ 0 & 10 & 0 \\ 1 & 0 & 4 \end{bmatrix}$$

Answers: (a) 0 (b) 0 (c) 36 (d) 36 (e) 52 (f) 0 (g) 0 (h) 0 (i) 0 (j) 0 (k) -28 (l) 600 (m) 7 (n) 70

Date: August 2012.

Exercise 1.2. Find the determinant of the following matrices.

$$(a) \begin{bmatrix} 10 & 9 \\ 11 & 10 \end{bmatrix}$$

$$(b) \begin{bmatrix} 5 & 2 & -1 \\ 0 & 0 & 1 \\ 6 & 2 & 3 \end{bmatrix}$$

$$(c) \begin{bmatrix} 3 & 2 & 0 \\ 4 & 3 & -2 \\ 8 & 9 & -7 \end{bmatrix}$$

$$(d) \begin{bmatrix} 0 & 3 & 0 & 0 \\ -2 & 9 & 0 & 0 \\ 8 & 11 & 2 & -2 \\ 7 & -5 & 1 & 3 \end{bmatrix}$$

$$(e) \begin{bmatrix} -4 & 1 & 3 \\ 3 & -5 & 2 \\ -1 & 2 & 0 \end{bmatrix}$$

$$(f) \begin{bmatrix} 1 & 2 & 4 \\ 1 & 3 & 9 \\ 1 & 5 & 25 \end{bmatrix}$$

$$(g) \begin{bmatrix} 3 & 5 & 0 & 0 \\ 2 & 4 & 0 & 0 \\ 0 & 0 & 2 & 1 \\ 0 & 0 & 5 & 3 \end{bmatrix}$$

$$(h) \begin{bmatrix} 7 & -4 & 0 & 0 \\ -4 & 3 & 0 & 0 \\ 0 & 0 & 5 & 2 \\ 0 & 0 & 9 & 3 \end{bmatrix}$$

$$(i) \begin{bmatrix} 20 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 8 & 9 \\ 0 & 0 & -6 & -7 \end{bmatrix}$$

$$(j) \begin{bmatrix} 0 & 0 & 8 & 9 \\ 0 & 0 & -6 & -7 \\ 0 & 1 & 0 & 0 \\ 20 & 0 & 0 & 0 \end{bmatrix}$$

$$(k) \begin{bmatrix} 4 & 6 & 2 \\ 2 & 3 & 1 \\ 5 & 1 & 6 \end{bmatrix}$$

$$(l) \begin{bmatrix} 5 & 5 & 5 \\ 2 & 1 & -1 \\ 3 & 4 & 6 \end{bmatrix}$$

Answers: (a) 1 (b) 2 (c) 15 (d) 48 (e) 17 (f) 6 (g) 2 (h) -15 (i) -40 (j) 40 (k) -13 (l) 0