

代幾 I 計算演習 [問題] (2006/09/28)

問. 次の行列の rank を計算しなさい。

Q.1

$$\begin{pmatrix} 1 & -1 & -1 & 1 \\ 0 & -2 & -3 & 3 \\ 4 & -2 & 0 & 1 \\ -1 & 1 & 1 & -1 \end{pmatrix}$$

Q.2

$$\begin{pmatrix} 5 & -3 & -3 & 5 & 1 \\ -6 & 2 & 1 & 1 & -1 \\ 8 & -4 & 1 & 9 & -1 \\ -3 & 2 & 1 & -5 & 0 \\ 9 & -4 & -2 & 4 & 1 \end{pmatrix}$$

Q.3

$$\begin{pmatrix} -2 & 1 & -1 & -1 \\ -1 & 1 & -1 & -1 \\ -3 & 1 & -1 & -1 \\ 4 & -2 & 2 & 2 \end{pmatrix}$$

Q.4

$$\begin{pmatrix} 5 & 1 & -4 \\ -1 & -1 & 1 \\ 0 & 1 & 0 \end{pmatrix}$$

Q.5

$$\begin{pmatrix} -1 & -2 & 0 & 1 & 1 \\ -2 & -5 & 0 & 2 & 3 \\ 1 & 5 & 1 & -1 & -4 \\ 1 & -4 & -2 & -1 & 5 \end{pmatrix}$$

Q.6

$$\begin{pmatrix} 1 & 2 & -1 & -2 \\ -1 & -2 & 1 & 2 \\ -1 & -2 & 1 & 2 \end{pmatrix}$$

Q.7

$$\begin{pmatrix} 3 & -4 & -2 \\ -2 & 3 & 0 \\ 2 & -3 & 0 \\ -4 & 6 & 1 \end{pmatrix}$$

Q.8

$$\begin{pmatrix} -6 & -6 & 3 & 6 & 6 \\ 8 & 8 & -4 & -8 & -8 \\ 2 & 2 & -1 & -2 & -2 \end{pmatrix}$$

Q.9

$$\begin{pmatrix} -3 & 0 & -1 & 2 \\ 3 & -1 & 2 & -2 \\ -1 & 0 & -1 & 1 \\ 4 & 1 & 1 & -3 \end{pmatrix}$$

Q.10

$$\begin{pmatrix} -4 & -5 & 5 & -8 \\ 3 & 1 & -3 & 5 \\ 2 & -2 & -4 & 9 \\ 1 & 6 & -1 & 0 \\ -3 & -1 & 3 & -5 \end{pmatrix}$$

Q.11

$$\begin{pmatrix} -8 & 2 & 6 & -4 \\ -4 & 1 & 3 & -6 \\ 3 & -1 & -2 & 0 \\ 4 & -1 & -3 & 7 \\ 8 & -2 & -6 & 8 \end{pmatrix}$$

Q.12

$$\begin{pmatrix} 1 & -2 & 2 & -5 & 3 \\ 0 & -1 & 2 & -3 & 2 \\ 0 & 1 & -2 & 3 & -2 \end{pmatrix}$$

Q.13

$$\begin{pmatrix} 1 & 0 & -1 & 2 & -1 \\ 4 & 4 & -4 & -1 & 3 \\ -3 & -2 & 3 & -1 & -1 \\ 2 & 4 & -2 & -4 & 4 \\ -4 & -4 & 4 & 0 & -2 \end{pmatrix}$$

Q.14

$$\begin{pmatrix} 1 & 0 & -1 & -1 \\ -2 & 2 & -1 & 2 \\ 1 & -1 & 1 & -1 \end{pmatrix}$$

Q.15

$$\begin{pmatrix} -3 & 4 & 0 & 3 & -2 \\ 6 & -9 & 1 & -6 & 4 \\ 2 & -2 & 0 & -2 & 1 \end{pmatrix}$$

Q.16

$$\begin{pmatrix} -5 & -1 & -6 & 5 \\ 1 & 1 & -1 & -1 \\ 1 & 0 & 2 & -1 \end{pmatrix}$$

Q.17

$$\begin{pmatrix} 2 & -3 & 4 & -1 \\ -2 & 3 & -4 & 1 \\ -2 & -3 & -2 & 3 \\ 0 & 3 & -1 & -1 \end{pmatrix}$$

Q.18

$$\begin{pmatrix} 5 & -4 & -1 & 6 & -2 \\ 3 & -3 & -3 & 9 & -3 \\ -1 & 5 & -3 & -4 & 3 \\ -5 & 5 & 1 & -8 & 3 \\ -1 & 0 & 1 & -1 & 0 \end{pmatrix}$$

Q.19

$$\begin{pmatrix} -1 & -2 & 3 & 2 & 2 \\ -2 & -3 & 5 & 3 & 4 \\ 2 & 3 & -5 & -3 & -4 \\ 1 & 2 & -3 & -2 & -2 \end{pmatrix}$$

Q.20

$$\begin{pmatrix} -1 & 1 & 0 & -2 \\ 1 & 2 & -1 & 1 \\ -1 & 1 & 0 & -2 \\ 1 & -4 & 1 & 3 \end{pmatrix}$$

Q.21

$$\begin{pmatrix} -3 & 3 & -2 \\ 3 & -3 & 2 \\ -3 & 3 & -2 \end{pmatrix}$$

Q.22

$$\begin{pmatrix} 1 & -1 & -1 & 1 \\ 0 & 0 & -2 & 1 \\ -1 & 2 & 8 & -6 \end{pmatrix}$$

Q.23

$$\begin{pmatrix} -5 & 4 & 2 \\ -3 & 2 & 2 \\ 1 & 0 & -1 \\ 0 & -1 & 1 \\ 8 & -6 & -4 \end{pmatrix}$$

Q.24

$$\begin{pmatrix} 1 & -1 & -2 & 0 & 0 \\ 2 & 6 & -4 & 2 & -6 \\ -4 & -4 & 8 & -2 & 6 \\ -2 & 4 & 4 & 1 & -2 \\ 2 & 2 & -4 & 1 & -3 \end{pmatrix}$$

Q.25

$$\begin{pmatrix} -1 & -1 & 2 \\ 1 & 4 & -7 \\ 1 & 2 & -4 \\ 0 & -2 & 4 \end{pmatrix}$$

Q.26

$$\begin{pmatrix} -7 & -3 & 8 \\ 7 & 3 & -8 \\ 7 & 3 & -8 \end{pmatrix}$$

Q.27

$$\begin{pmatrix} -1 & 1 & -1 \\ -1 & 1 & -1 \\ 1 & -1 & 1 \\ 0 & 0 & 1 \\ 1 & -1 & 1 \end{pmatrix}$$

Q.28

$$\begin{pmatrix} 2 & -2 & 2 & 4 \\ -1 & 1 & -1 & -2 \\ -1 & 1 & -1 & -2 \end{pmatrix}$$

Q.29

$$\begin{pmatrix} 8 & 7 & -8 & 4 & -7 \\ -5 & -4 & 5 & -2 & 4 \\ -5 & -4 & 5 & -2 & 4 \\ 8 & 4 & -8 & 0 & -4 \end{pmatrix}$$

Q.30

$$\begin{pmatrix} 1 & 0 & -1 \\ 0 & -1 & 3 \\ -1 & 1 & -2 \end{pmatrix}$$

Q.31

$$\begin{pmatrix} -1 & 2 & 2 \\ 1 & -1 & -2 \\ 0 & -1 & 1 \end{pmatrix}$$

Q.32

$$\begin{pmatrix} -5 & 0 & 3 & 8 & -4 \\ 4 & 7 & -9 & -3 & 4 \\ -3 & -2 & 5 & -9 & 9 \\ 5 & -5 & -1 & -4 & 0 \\ -5 & 7 & 1 & 5 & -2 \end{pmatrix}$$

Q.33

$$\begin{pmatrix} -4 & -2 & -3 & 3 \\ 4 & 6 & 4 & -4 \\ 6 & 4 & 6 & -5 \\ -2 & -7 & -3 & 3 \end{pmatrix}$$

Q.34

$$\begin{pmatrix} 6 & -2 & -6 \\ 3 & -1 & -3 \\ -9 & 3 & 9 \\ 3 & -1 & -3 \end{pmatrix}$$

Q.35

$$\begin{pmatrix} 4 & 5 & -4 & 4 \\ 1 & -1 & 0 & 0 \\ -1 & -1 & 1 & -1 \end{pmatrix}$$

Q.36

$$\begin{pmatrix} -6 & 2 & 1 & 0 & 4 \\ 4 & -1 & -5 & 2 & -7 \\ -4 & 0 & -1 & 4 & -6 \\ 2 & 1 & -1 & -3 & 5 \\ 5 & -3 & 5 & -1 & -1 \end{pmatrix}$$

代幾 I 計算演習 [解答] (2006/09/28)

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|---------------|---------------|
| A.1 rank = 3 | A.19 rank = 2 |
| A.2 rank = 3 | A.20 rank = 2 |
| A.3 rank = 2 | A.21 rank = 1 |
| A.4 rank = 3 | A.22 rank = 3 |
| A.5 rank = 3 | A.23 rank = 3 |
| A.6 rank = 1 | A.24 rank = 3 |
| A.7 rank = 3 | A.25 rank = 3 |
| A.8 rank = 1 | A.26 rank = 1 |
| A.9 rank = 3 | A.27 rank = 2 |
| A.10 rank = 4 | A.28 rank = 1 |
| A.11 rank = 3 | A.29 rank = 2 |
| A.12 rank = 2 | A.30 rank = 2 |
| A.13 rank = 3 | A.31 rank = 3 |
| A.14 rank = 3 | A.32 rank = 5 |
| A.15 rank = 3 | A.33 rank = 3 |
| A.16 rank = 3 | A.34 rank = 1 |
| A.17 rank = 2 | A.35 rank = 3 |
| A.18 rank = 3 | A.36 rank = 4 |