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IG - Maths
0580

Matrices.

Exercise - Paper 2.

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Matrices Paper-2 Exercise

Q1 Workout. (a) $\begin{pmatrix} 2 & 1 \\ 4 & 3 \end{pmatrix}^2$ --- [2]

(b) $\begin{pmatrix} 2 & 1 \\ 4 & 3 \end{pmatrix}^{-1}$ --- [2]

SP-15 | 02 | Q11

Q2 $M = \begin{pmatrix} 5 & 3 \\ 1 & -2 \end{pmatrix}$ $N = \begin{pmatrix} 3 & -6 \\ 4 & 2 \end{pmatrix}$

Calculate: (a) MN ---[2]

(b) M^{-1} ---[2]

M-17 | 22 | Q18

Q3 $M = \begin{pmatrix} -2 & 0 \\ 5 & -6 \end{pmatrix}$ $N = \begin{pmatrix} -3 & 1 \\ 0 & -1 \end{pmatrix}$

W-17 | 23 | Q19

(a) Work out NM --- [2]

(b) Find M^{-1}, the inverse of M. --- [2]

Q4 Find the inverse of the matrix $\begin{pmatrix} 3 & -2 \\ -8 & 7 \end{pmatrix}$ ---[2]

M-16 | 22 | Q8

Q5 $M = \begin{pmatrix} 5 & 1 \\ -3 & -2 \end{pmatrix}$

S-16 | 22 | Q22

(a) Workout $4M$ --- [2]

(b) Workout M^2 --- [2]

(c) Find M^{-1}, the inverse of M. --- [2]

Q6 Workout. (a) $2\begin{pmatrix} 3 \\ 5 \end{pmatrix} - \begin{pmatrix} 1 \\ 2 \end{pmatrix}$ ---[1]

W-16 | 21 | Q15

(b) $\begin{pmatrix} 1 & 2 \end{pmatrix}\begin{pmatrix} 2 \\ 3 \end{pmatrix}$ --- [2]

Q7 (a) Find the inverse of $\begin{pmatrix} 2 & -3 \\ 5 & -4 \end{pmatrix}$ --- [2]

(b) The Matrix $\begin{pmatrix} w & -9 \\ 4 & w-12 \end{pmatrix}$ does not have an inverse.

Find the value of w. ---[4]

W-16 | 22 | Q19

Q8 $A = \begin{pmatrix} 4 & 2 \\ 2 & 1 \end{pmatrix}$ $B = \begin{pmatrix} 7 & -3 \\ 4 & 5 \end{pmatrix}$ $C = \begin{pmatrix} -2 & 3 & 1 \\ 4 & 5 & -1 \end{pmatrix}$ $D = \begin{pmatrix} -9 \\ 0 \end{pmatrix}$

(a) Which of these four matrix calculations is not possible.

A+B 3C CB AD ---[1]

(b) Calculate AB ---[2]

(c) Work out B^{-1}, the inverse of B. ---[2]

(d) Explain why A does not have an inverse. --[1]

W-16|23|Q25

Q9 $A = \begin{pmatrix} 8 & 3 \\ 4 & 2 \end{pmatrix}$ find: (a) A^2 ---[2]

(b) A^{-1} M-15|22|Q15 --[2]

Q10 (a) Calculate $\begin{pmatrix} 3 & 7 \\ -1 & 4 \end{pmatrix}\begin{pmatrix} -2 & 1 \\ 4 & 2 \end{pmatrix}$ S-15|21|Q22 --[2]

(b) Calculate the inverse of $\begin{pmatrix} 5 & 3 \\ 6 & 4 \end{pmatrix}$ ---[2]

Q11 $M = \begin{pmatrix} 3 & 1 \\ -11 & -2 \end{pmatrix}$

S-15|22|Q11

Find M^{-1}, the inverse of M. --[2]

Q12(a) Work out $\begin{pmatrix} 1 & -2 \\ 3 & 4 \end{pmatrix}\begin{pmatrix} -5 & -3 \\ 2 & 1 \end{pmatrix}$ ---[2]

W-15|21|Q18

(b) Find the inverse of $\begin{pmatrix} 1 & -2 \\ 3 & 4 \end{pmatrix}$ ---[2]

(c) Explain why it is not possible to work out $\begin{pmatrix} 1 & -2 \\ 3 & 4 \end{pmatrix} + \begin{pmatrix} 3 \\ 2 \end{pmatrix}$ --[1]

Q13 $M = \begin{pmatrix} 3 & -4 \\ -2 & 4 \end{pmatrix}$ $N = \begin{pmatrix} 5 & 0 \\ 1 & 2 \end{pmatrix}$ W-15|22|Q7

Calculate MN. --[2]

Q14 $M = \begin{pmatrix} 7 & u \\ 2 & 3 \end{pmatrix}$ and $|M| = 1$

W-15|23|Q13

Find the value of u. --[2]

Q15 $A = \begin{pmatrix} 2 & 8 \\ 1 & 4 \end{pmatrix}$ Work out $A^2 - 4A$. ---[3]

W-14|21|Q14

Q16 $A = \begin{pmatrix} 3 & -2 \\ 1 & 4 \end{pmatrix}$ $B = \begin{pmatrix} 2 & 0 \\ -5 & 7 \end{pmatrix}$

(a) Calculate BA. --[2]

W-14|22|Q11

(b) Find the determinant of A. --[1]

Q17 $M = \begin{pmatrix} 4 & 2 \\ 3 & 5 \end{pmatrix}$ Find (a) M^2 S-14|22|Q15 --[2]

(b) the determinant of M. --[1]

Q18 $A = \begin{pmatrix} 5 & 2 \\ 4 & 3 \end{pmatrix}$ (a) Calculate A^2 --[2]

(b) Calculate A^{-1}. S-14|23|Q18 --[2]

Q19 $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$ $B = \begin{pmatrix} 4 & 3 \\ 1 & 2 \end{pmatrix}$

Find.

(a) AB S-13|21|Q24 --[2]

(b) B^{-1} --[2]

Q20 $M = \begin{pmatrix} 2 & 3 \\ 3 & 6 \end{pmatrix}$ $N = \begin{pmatrix} 2 & 1 & 5 \\ 1 & 7 & 2 \end{pmatrix}$

(a) Work out MN --[2]

(b) Find M^{-1} S-13|23|Q17 --[2]

Q21 $A = \begin{pmatrix} 3 & -1 \\ 4 & 2 \end{pmatrix}$ $I = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

Work out the following.

(a) AI [1]

(b) A^{-1} [2]

W-13|23|Q11

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Answers

Q1 (a) $\begin{pmatrix} 8 & 5 \\ 20 & 13 \end{pmatrix}$ (b) $\begin{pmatrix} 1\frac{1}{2} & -\frac{1}{2} \\ -2 & 1 \end{pmatrix}$

Q2 (a) $\begin{pmatrix} 27 & -24 \\ -5 & -10 \end{pmatrix}$ (b) $-\frac{1}{13}\begin{pmatrix} -2 & -3 \\ -1 & 5 \end{pmatrix}$

Q3 (a) $\begin{pmatrix} 11 & -6 \\ -5 & 6 \end{pmatrix}$ (b) $\frac{1}{12}\begin{pmatrix} -6 & 0 \\ -5 & -2 \end{pmatrix}$

Q4 $\frac{1}{5}\begin{pmatrix} 7 & 2 \\ 8 & 3 \end{pmatrix}$

Q5 (a) $\begin{pmatrix} 20 & 4 \\ -12 & -8 \end{pmatrix}$ (b) $\begin{pmatrix} 22 & 3 \\ -9 & 1 \end{pmatrix}$

(c) $-\frac{1}{7}\begin{pmatrix} -2 & -1 \\ 3 & 5 \end{pmatrix}$

Q6 (a) $\begin{pmatrix} 5 \\ 8 \end{pmatrix}$ (b) (8)

Q7 (a) $\frac{1}{7}\begin{pmatrix} -4 & 3 \\ -5 & 2 \end{pmatrix}$ (b) 6

Q8 (a) CB (b) $\begin{pmatrix} 36 & -2 \\ 18 & -1 \end{pmatrix}$

(c) $\frac{1}{47}\begin{pmatrix} 5 & 3 \\ -4 & 7 \end{pmatrix}$ (d) as $|A| = 0$

Q9 (a) $\begin{pmatrix} 76 & 30 \\ 40 & 16 \end{pmatrix}$ (b) $\frac{1}{4}\begin{pmatrix} 2 & -3 \\ -4 & 8 \end{pmatrix}$

Q11 $\frac{1}{5}\begin{pmatrix} -2 & -1 \\ 11 & 3 \end{pmatrix}$

Q10 (a) $\begin{pmatrix} 22 & 17 \\ 18 & 7 \end{pmatrix}$ (b) $\frac{1}{2}\begin{pmatrix} 4 & -3 \\ -6 & 5 \end{pmatrix}$

12 (a) $\begin{pmatrix} -9 & -5 \\ -7 & -5 \end{pmatrix}$ (b) $\frac{1}{10}\begin{pmatrix} 4 & 2 \\ -3 & 1 \end{pmatrix}$

(c) Not the same order.

Q13 $\begin{pmatrix} 11 & -8 \\ -6 & 8 \end{pmatrix}$

Q14 6

Q15 $\begin{pmatrix} 4 & 16 \\ 2 & 8 \end{pmatrix}$

Q16 (a) $\begin{pmatrix} 6 & -4 \\ -8 & 38 \end{pmatrix}$ (b) 14

Q17 (a) $\begin{pmatrix} 22 & 18 \\ 27 & 31 \end{pmatrix}$ (b) 14

Q18 $\begin{pmatrix} 33 & 16 \\ 32 & 17 \end{pmatrix}$ (b) $\frac{1}{7}\begin{pmatrix} 3 & -2 \\ -4 & 5 \end{pmatrix}$

Q19 (a) $\begin{pmatrix} 6 & 7 \\ 16 & 17 \end{pmatrix}$ (b) $\frac{1}{5}\begin{pmatrix} 2 & -3 \\ -1 & 4 \end{pmatrix}$

Q20 (a) $\begin{pmatrix} 7 & 23 & 16 \\ 12 & 45 & 27 \end{pmatrix}$

(b) $\frac{1}{3}\begin{pmatrix} 6 & -3 \\ -3 & 2 \end{pmatrix}$

Q21 (a) $\begin{pmatrix} 3 & -1 \\ 4 & 2 \end{pmatrix}$ (b) $\frac{1}{10}\begin{pmatrix} 2 & 1 \\ -4 & 2 \end{pmatrix}$

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