

MATH6038: Maple (Sample) Test

Use Maple to help you find the answers to the following questions.

Name: _____

ANSWER ALL QUESTIONS IN THE SPACES PROVIDED.

DO NOT LOOK AT YOUR NEIGHBOURS WORK.

THIS IS AN OPEN-BOOK ASSESSMENT AND ANY INFORMATION YOU CAN ACCESS AT YOUR WORKSTATION YOU ARE FREE TO USE.

1. Solve the following linear systems.

(a)

$$\begin{aligned}x + 2y - z &= 2 \\2x + 5y + 2z &= -1 \\7x + 17y + 5z &= -1\end{aligned}$$

Ans: _____

(b)

$$\begin{aligned}x + y + 10z &= -6 \\3x + y - 4z &= 16 \\4x + y + 6z &= 10\end{aligned}$$

Ans: _____

(c)

$$\begin{pmatrix} 1 & 1 & -1 \\ 4 & -5 & 2 \\ 5 & -4 & 1 \end{pmatrix} \begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 2 \\ -1 \\ 3 \end{pmatrix}.$$

Ans: _____

2. For the matrices

$$A = \begin{pmatrix} 2 & 1 & 0 \\ 3 & -2 & -1 \end{pmatrix}, B = \begin{pmatrix} 1 & 2 & 1 \\ -3 & 2 & 0 \end{pmatrix}, C = \begin{pmatrix} 5 & 3 \\ 2 & -1 \\ 3 & 4 \end{pmatrix}.$$

Determine each of the following, if defined

(a) $A + B$

Ans: _____

(b) $A + C$

Ans: _____

(c) $(A + B)^T$

Ans: _____

(d) AC

Ans: _____

(e) CA

Ans: _____

3. Find the inverse of the matrix

$$B = \begin{bmatrix} 1 & 0 & -2 \\ -3 & 1 & 4 \\ 2 & -3 & 4 \end{bmatrix}.$$

Ans: _____

4. Does the following homogenous system of linear equations have non-trivial solutions?

$$\begin{aligned} 2x - 4y - 5z &= 0 \\ 3x + y - 4z &= 0 \\ x - 6y - z &= 0. \end{aligned}$$

Ans: _____

5. Calculate the determinant of

$$\begin{bmatrix} 1 & 3 & 2 \\ 2 & -1 & -3 \\ 5 & 2 & 1 \end{bmatrix}.$$

Ans: _____

6. The probability of a citizen completing the online payment by the deadline for the Household Charge is 0.65. Use a *Binomial distribution* to find the probability that in a group of 15 citizens,

(a) exactly 10 will have paid online by the deadline.

Ans: _____

(b) at least 3 will have paid online by the deadline.

Ans: _____

7. Suppose that the number of goals scored in 90 minutes of European Soccer Championship play is a *Poisson distribution* with an average of 2.5 goals per game. Find the probability that in a given 90 minute match

(a) there is a 0-0 draw.

Ans: _____

(b) five or more goals are scored.

Ans: _____