

MAC 2234: Survey of Calculus II

Practice Exam # 3

The actual exam will be very similar to this practice test. You will have 90 minutes to complete the exam in WebAssign. I suggest you attempt this under time restrictions to get the best practice possible.

- (1) Determine whether the system of linear equations has exactly one solution, infinitely many solutions, or no solution.

$$\begin{aligned}x + 2y - 3z &= -2 \\3x - y - 2z &= 1 \\2x + 3y - 5z &= -3\end{aligned}$$

- (2) Use Gauss-Jordan elimination to solve the following system.

$$\begin{aligned}2y + 3z &= 7 \\3x + 6y - 12z &= -3 \\5x - 2y + 2z &= -7\end{aligned}$$

The solutions x, y, z all lie in which of the following intervals?

- (a) $[-13.4, 0.7]$
- (b) $[-7.4, 2.5]$
- (c) $[0.1, 9.3]$
- (d) $[2.4, 10.7]$

- (3) Formulate a system of equations for the situation below and solve.
A television factory tests 500 units before shipping them to stores. The televisions are rated as “acceptable,” “defective but reparable,” or “defective and irreparable.” The results showed that 50 units were “defective but reparable” or “defective and irreparable” and that the number of “acceptable” units exceeded the number of “defective and irreparable” units by 430. How many units fall into each of the three categories?
- (4) A cruise company operates four cruises between several cities in Europe. The number of each type of cruise planned for 2018 is given by matrix A :

$$A = \begin{array}{c} \text{Cruise} \\ \begin{matrix} & \text{I} & \text{II} & \text{III} & \text{IV} \\ \begin{matrix} \text{I} \\ \text{II} \\ \text{III} \\ \text{IV} \end{matrix} & \begin{bmatrix} 12 & 14 & 20 & 10 \end{bmatrix} \end{matrix} \end{array}$$

For each cruise, the classes of cabins are classified into three categories, X , Y , and Z , given by matrix B :

		Category		
		X	Y	Z
$B =$	I	20	30	40
	II	20	20	55
	III	15	35	45
	IV	25	30	40

The fares per pasenger (in dollars) for each category of cabin is given by matrix C :

		Category X	800
$C =$	Category Y	10000	7000
	Category Z	7000	

Compute ABC and explain its meaning.

- (5) Find the $(1, 3)$ entry of the inverse of the matrix, if it exists.

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

- (6) A simple economy consists of two industries: agriculture and manufacturing. The production of 1 unit of agricultural products requires consumption of 0.4 units of agriculture and 0.1 units of manufactured goods. The production of 1 unit of manufactured goods requires the consumption of 0.2 units of agricultural products and 0.2 units of manufactured goods.
- (a) Find the gross output of goods needed to satisfy a consumer demand for \$50 million worth of agricultural products and \$10 million worth of manufactured goods. (Round your answers to 1 decimal place.)
- (b) Find the value of goods consumed in the internal process of production in order to meet the gross output. (Round your answers to 1 decimal place.)