EGR 106 Sample Exam Name Solution in Red

Closed Book & Notes
No Calculators
Put Cell Phones Away

Given the arrays: $A=\begin{bmatrix}1 & 3\\ 2 & 4\end{bmatrix}$, $B=\begin{bmatrix}3 & 1 & 4\\ 2 & 1 & 5\end{bmatrix}$, $C=\begin{bmatrix}2 & 0\\ 3 & 5\\ 1 & 2\end{bmatrix}$, $a=\begin{bmatrix}2 & 4\end{bmatrix}$, $b=\begin{bmatrix}2\\ 3\\ 1\end{bmatrix}$

For the following MATLAB commands / scripts, write down the output that would appear in the Command Window if the script was run. (5 points each)

Command / Script	Command Window Output
`3+9/3^2`	`4`
`cos(pi/2)`	`0`
`[0:4:12]`	`0 4 8 12`
`linspace(0,8,5)`	`0 2 4 6 8`
`zeros(3,4)`	`0 0 0 0` `0 0 0 0` `0 0 0 0`

Command / Script	Command Window Output
`size(C)`	`3 2`
`C([1,3],[1,2])`	`2 0` `1 2`
`B*C`	`13 13` `12 15`
`a=[6,7;1,5;7,3];` `disp(['a21=',num2str(a(2,1))])`	`a21 = 1`

`x1=[4,9;12,3];`
`x2=[2,3;6,3];`
`x3=x1./x2`
	`x3 =`
	`2 3`
	`2 1`

Write MATLAB command(s) to do each of the following problems. Do not do any computations. Simply give the Matlab command(s). (8 Points each).

Problem	MATLAB Command(s)

Without typing all entries, create a row vector containing the six elements 2, 5, 8, 11, 14	`2:3:14`
	or
	`linspace(2,14,5)`

Using direct entry, create the matrix named $M = \begin{bmatrix} 1 & 2 & 1 \\ 3 & 5 & 2 \\ 2 & 1 & 8 \end{bmatrix}$	`M=[1,2,1;3,5,2;2,1,8]`
Give the MATLAB expression to evaluate $y = \frac{7 - \sqrt{3^3 + 4^2}}{\sin(\pi / 4)}$	`y=(7-sqrt(3^3+4^2))/sin(pi/4)`
Create an array with 3 rows and 2 columns where the elements are random numbers between zero and one	`rand(3,2)`
Define an array of x values = 0 3 6 9. Using element-by-element operations, compute $y = 2x^2 - 5x + 2$ for each value of x	`x=0:3:9` `y=2*x.^2-5*x+2`

A system of linear algebraic equations can always be written in matrix form $AX = b$. For the system shown, create the A and b matrices, and then solve the system for the unknowns x,y,z in the X matrix.
$2x + 2y - z = 4$
$x - 5y + z = 7$
$3x + 4y - 3z = 3$
	`A=[2,2,-1;1,-5,1;3,4,-3]`
	`b=[4;7;3]`
	`x=A\b  (or x=inv(A)*b or x=A^-1*b)`