Ma1 PA Answer Sheet

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Task 1: *MATLAB as a Calculator*

Part A: Use MATLAB to calculate the value of each expression. Copy the command from MATLAB into the second column of the table below and the result from MATLAB into the third column.

Expression	MATLAB command	MATLAB result
$p = (2 + 7)^3 + (273^{2/3})/2 + (55^2)/3$	p = (2 + 7)^3 + (273^(2/3))/2 + (55^2)/3	`1.7584e+03`
$q = 2^3 + 7^3 + (273^2)/2 + 55^{2/3}$	q = 2^3 + 7^3 + (273^2)/2 + 55^(2/3)	`3.7630e+04`
$r = \lvert 1 - 0.4\tan^{-1}(\pi/6)\rvert$	r = abs(1-.4*atan(pi/6))	`0.8071`

Part B: Define the variables x and z as x = 9.6 and z = 8.1. Use MATLAB to calculate the value of each expression. Copy the command from MATLAB into the second column of the table below and the result from MATLAB into the third column.

Expression	MATLAB command	MATLAB result
$a = xz^2 - \left(\frac{2z}{3x}\right)^{3/5}$	a = x * z^2 - ((2*z) / (3*x))^(3/5)	`629.1479`
$b = \frac{443z}{2x^3} + \frac{e^{-xz}}{x+z}$	b = ((443*z) / (2*x^3)) + (exp(-x*z) / (x+z))	`2.0279`
$c = \ln(z)$	c = log(z)	`2.0919`
$d = \log(z)$	d = log10(z)	`0.9085`

Task 2: *Assigning Vectors & Performing Operations*

Part A: Complete the table below.

Mathematical Operation	MATLAB Answer/Response	Explanation of the Result
`Arowvector + Arowvector`	`0 2 4 6`	0 + 0 = 0 1 + 1 = 2 2 + 2 = 4 3 + 3 = 6
`Arowvector + Browvector`	`4 3 2 1`	0 + 4 = 4 1 + 2 = 3 2 + 0 = 2 3 + -2 = 1
`Arowvector + Ascalar`	`3 4 5 6`	0 + 3 = 3 1 + 3 = 4 2 + 3 = 5 3 + 3 = 6
`Arowvector – Arowvector`	`0 0 0 0`	0 – 0 = 0 1 – 1 = 0 2 – 2 = 0 3 – 3 = 0
`Arowvector – Crowvector`	`Matrix dimensions must agree.`	Arowvector is 4 elements long and Crowvector is 3 elements long
`Acolvector + Bcolvector`	`Matrix dimensions must agree.`	Acolvector is 4 elements long and Bcolvector is 3 elements long

`Arowvector + Bcolvector`	`-5 -4 -3 -2`
	`0 1 2 3`
	`5 6 7 8`
		0 1 2 3 + -5 = -5 -4 -3 -2
		0 1 2 3 + 0 = 0 1 2 3
		0 1 2 3 + 5 = 5 6 7 8

Part B: Complete the table below.

Mathematical Operation	MATLAB Answer/Response	Explanation of the Operation
`Arowvector * Browvector`	`Incorrect dimensions for matrix multiplication.`	Two row vectors must be multiplied using .*
`Arowvector .* Browvector`	`0 2 0 -6`	0 * 4 = 0

		1 * 2 = 2 2 * 0 = 0 3 * -2 = -6
`Arowvector * Ascalar`	`0 3 6 9`	0 * 3 = 0 1 * 3 = 3 2 * 3 = 6 3 * 3 = 9
`Arowvector .* Ascalar`	`0 3 6 9`	0 * 3 = 0 1 * 3 = 3 2 * 3 = 6 3 * 3 = 9
`Arowvector ./ Browvector`	`0 0.5 Inf -1.5`	0 / 4 = 0 1 / 2 = .5 2 / 0 = No solution 3 / -2 = -1.5
`Arowvector ^ Ascalar`	`Incorrect dimensions for raising a matrix to a power.`	Matrix cannot be raised to a scalar power
`Arowvector .^ Ascalar`	`0 1 8 27`	0 ^ 3 = 0 1 ^ 3 = 1 2 ^ 3 = 8 3 ^ 3 = 27

Task 3: *Matrix Manipulations*

Part B: Complete the table below.

Function	MATLAB Command
Create a **Bmatrix** by replacing the middle row of **Amatrix** with the **Bvector**.	Bmatrix = [Amatrix(1,:);Bvector;Amatrix(3,:)]
Create the **Gvector** by extracting the third row in **Amatrix**.	Gvector = Amatrix(3,:)
Extract row 2, column 3 from **Amatrix**	y = Amatrix(2,3)
Replace the value 2 in **Amatrix** (row 1 and column 1) with the value 55.	Amatrix(1,1) = 55