

Problem 1 (10 pts.):

Write an appropriate short MATLAB command for each of the following.

- a. MATLAB command to assign x to be 12, 16, 20, 24, ..., 300

$$x = 12:4:300$$

- b. MATLAB command to assign x to be 142 *evenly spaced* numbers from 87 to 325

$$x = \text{linspace}(87, 325, 142)$$

	Midterm
	Overall

Problem 2 (15 pts.):

Convert the following MATLAB expressions to standard mathematical expressions.
Use parentheses to clearly indicate the order of operations:

a. $x+y./x-z$

$$x + \frac{y}{x} - z$$

b. $\cos(x)^{3/7}*\text{sqrt}(x)$

$$\frac{1}{7} (\cos^3(x)) \cdot \sqrt{x}$$

c. $x-y*(z+x)./(y-x)$

$$x - \frac{y(z+x)}{y-x}$$

Problem 3 (10 pts.):

Convert each of the following expressions to its MATLAB equivalent (for vectors with 100 elements):

a. $\frac{x}{3 - \frac{y}{z}}$

$x ./ (3 - y ./ z)$

b. $\frac{\cos^2 x}{x} + \frac{e^{\sqrt{x}}}{\pi}$

$\cos(x).^2 ./ x + \exp(\sqrt{x}) ./ \pi$

Problem 4 (15 pts.):

Plot the following functions on the interval $(\pi, 5)$.

$$f(x) = \frac{\sin(9x)}{e^x}$$

$$g(x) = \frac{\cos(9x)}{x^3}$$

- a. What command generates the x -values?

$$x = \text{linspace}(\pi, 5)$$

- b. What commands generate the y -values?

$$f = \sin(9 \cdot x) ./ \exp(x)$$

$$g = \cos(9 \cdot x) ./ x.^3$$

- c. What command plots the functions together on one graph?

$$\text{plot}(f, g) \quad \text{plot}(x, f, x, g)$$

- d. How many times do the two curves intersect for $\pi < x < 5$? 5

- e. What is the number of local maxima (peaks) for each function?
(Exclude endpoints)

Number of local maxima for $f(x)$ is 2.

Number of local maxima for $g(x)$ is 3.

Problem 5 (15 pts.):

Find the minimum point (x -value) to two decimal places for $f(x) = \left(e^{-x} + \frac{3}{(x-3)^2} \right)$ on $(0, 3)$. Write the MATLAB commands you used to get your answer.

$x = \text{linspace}(0, 3); f = \exp(-x) + 3 ./ (x-3).^2$

then plot with

$(0, 2.9)$

$(0, 2)$

$(0.5, 1)$

$(0.65, 0.75)$

answer 0.70