

Problem 1 (10 pts.):

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

- a. MATLAB command to assign x to be 12, 15, 18, 21, ..., 300

$12:3:300$

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

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

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. $\frac{x}{\frac{y}{z} - 2}$

$x ./ (y ./ z - 2)$

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

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

Problem 4 (15 pts.):

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

$$f(x) = \frac{\sin(12x)}{e^x}$$

$$g(x) = \frac{\cos(12x)}{x^3}$$

- a. What command generates the x -values?

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

- b. What commands generate the y -values?

$$f = \sin(12 \cdot x) ./ \exp(x)$$

$$g = \cos(12 \cdot x) ./ x.^3$$

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

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

- d. How many times do the two curves intersect for $\pi < x < 5$? 7

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

Number of local maxima for $f(x)$ is 4.

Number of local maxima for $g(x)$ is 3/4.

Problem 5 (15 pts.):

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

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

replot with $(0, 1.9)$

$(0, 1.5)$

$(0.5, 1)$

$(0.7, 0.8)$

$(0.76, 0.79)$

answer 0.77