



**Problem 3** (12 pts.):

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

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

b.  $\sin(x)^2/5*\text{sqrt}(x)$

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

**Problem 4** (12 pts.):

Convert each of the following expressions to its MATLAB equivalent:

a.  $x^{y^z}$

b.  $\frac{x}{\frac{y}{z}}$

c.  $\frac{\arctan^2 x}{8} + \frac{5e^{\sqrt{x}}}{3}$

**Problem 5** (10 pts.):

Suppose  $a$ ,  $b$ ,  $c$  are vectors with 100 elements. Each given MATLAB expression has unnecessary dots and/or parantheses. Choose the correct MATLAB expression with the fewest dots and parantheses.

Circle the correct MATLAB expression with the fewest dots and parantheses.

$$\text{a. } (a.+b) .-(b+c) \quad \left\{ \begin{array}{l} \text{1.) } (a+b)-(b+c) \\ \text{2.) } a+b-(b+c) \\ \text{3.) } a+b-b+c \\ \text{4.) } (a+b)-b+c \\ \text{5.) } a+(b-b+c) \end{array} \right.$$

$$\text{b. } 6.*(b^5) \quad \left\{ \begin{array}{l} \text{1.) } 6*(b.^5) \\ \text{2.) } 6*b.^5 \\ \text{3.) } 6.*b.^5 \\ \text{4.) } 6.*(b.^5) \\ \text{5.) } 6.*b^5 \end{array} \right.$$

$$\text{c. } a/(b/c) \quad \left\{ \begin{array}{l} \text{1.) } a/b/c \\ \text{2.) } (a/b) ./c \\ \text{3.) } a./b./c \\ \text{4.) } a./(b./c) \\ \text{5.) } (a./b) ./c \end{array} \right.$$

**Problem 6** (10 pts.):

Let  $f(x) = 2x^4 - 13x^2 - 30$ .

a. Write the commands to compute the roots of  $f(x)$  using the `roots` function in MATLAB.

b. How many roots are listed as the output of the `roots` function? \_\_\_\_\_

c. What are the real root(s) (accurate to 4 decimal places)?



**Problem 8** (15 pts.):

Find the minimum (to two decimal places) of  $f(x) = \left( \cos(x) + \frac{1}{(x - \pi)^2} \right)$  on  $(0, \pi)$ .

Write the MATLAB commands you used to get your answer.

**Problem 9** (15 pts.):

Use MATLAB to find where the following functions are equal (to two decimal places).

Write the MATLAB commands, and/or explain how you got your answer.

$$f(x) = 5 \cos(3x) \quad \text{and} \quad g(x) = -7x + 50$$