

Math 229 Midterm Exam

Date: October 27, 2005

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You may use only MATLAB during this exam. No calculators.

NAME: _____

Exercise 1 (*9 pts.*):

What are the most appropriate MATLAB commands to generate the following sequences?

- a. MATLAB command for $7, 14, 21, 28, \dots, 140$

- b. MATLAB command for $0, 1.5, 3, 4.5, 7.5, \dots, 90$

- c. MATLAB command for 500 *evenly spaced* numbers from 12 to 307

Exercise 2 (9 pts.):

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

a. `a+b./a-c`

b. `cos(x)^2/3*x`

c. `(a-b*(c-a))./(c-a)`

Exercise 3 (5 pts.):

What are the MATLAB commands to plot the horizontal line $y = 10$ for $0 \leq x \leq 50$? (Make sure it's a solid line, not dots!)

Exercise 4 (*9 pts.*):

Convert each of the following expressions to its MATLAB equivalent:

a.

$$a^{b^c}$$

b.

$$\frac{a}{\frac{b}{c}}$$

c.

$$\frac{\arcsin^2 x}{4} + \frac{2e^{x^2}}{5}$$

Exercise 5 (15 pts.):

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

Sample: $(a.+b)*(b+c).+(a/b)$

with redundant parantheses removed: $(a.+b)*(b+c).+a/b$

Final answer, with dots corrected: $(a+b).*(b+c)+a./b$

- a. $(3.*a^2)-(4.*a)+12$
 - 1. $(3*a.^2)-(4*a)+12$
 - 2. $3.*a^2-4.*a+12$
 - 3. $3*a.^2-4*a+12$
 - 4. $3*a.^2-4*a.+12$

- b. $4.*(b^3).-(2*a)$
 - 1. $4*(b.^3)-(2*a)$
 - 2. $4*b.^3-2*a$
 - 3. $4*(b.^3)-2*a$
 - 4. $4.*b^3-2.*a$

- c. $(a.+b)-(b+c)$
 - 1. $a+b-(b+c)$
 - 2. $a+b-b+c$
 - 3. $(a+b)-(b+c)$
 - 4. $a.+b.-b.+c$

- d. $a/(b/c)$
 - 1. $a/b/c$
 - 2. $a./b./c$
 - 3. $a./(b./c)$
 - 4. $(a./b)./c$

- e. $(\sin(a./3))/(b.-4)+(7/b)$
 - 1. $\sin(a./3)./(b.-4)+7/b$
 - 2. $\sin(a/3)/(b-4)+(7/b)$
 - 3. $\sin(a/3)./b-4+7./b$
 - 4. $\sin(a/3)./(b-4)+7./b$

Exercise 6 (15 pts.):

Plot the following functions on the interval $(\pi, 2\pi)$.

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

- a. What command generates the x -values?

- b. What commands generate the y -values?

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

- d. What is the number of local minima for each function? (Exclude end-points)

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

Exercise 7 (20 pts.):

Determine the period of the function $f(x) = \cos(3\pi x) + \sin(2\pi x)$.

Explain how you found it.

Exercise 8 (20 pts.):

Use MATLAB to find where the following functions are equal.

Explain how you found it.

$$f(x) = 6 \cos(3x) \quad \text{and} \quad g(x) = -4x + 42$$