Math 2229 Computer lab Fall 11 Final b

Name: _Solutions_

- Do all of the following questions. Write out the commands you type into MATLAB as well as the final answers.

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

1	10	
2	10	
3	10	
4	10	
5	10	
6	10	
	60	

Final	
Overall	

1. Write the following MATLAB expressions as an ordinary mathematical exression.

   (a) a - b./c - d

   (b) exp(a - b)./c + d

   Write out the MATLAB command corresponding to the following ordinary mathematical expressions.

   (c) $\frac{z+t}{y+x}$

   (d) $\frac{e^{z^2}}{t} + \frac{x}{y+1}$

a) $a - \dfrac{b}{c} - d$

b) $\dfrac{e^{a-b}}{c} + d$

c) $(z+t)./(y+x)$

d) $\exp(z.\wedge 2)./t + x./(y+1)$

2. Find all solutions to $\ln(x) = 1000 - x^2 + 12\cos(2x)$ correct to three decimal places.

$x = \text{linspace}(0,100);$ $\text{plot}(x, \log(x) - 1000 + x.^2 - 12*\cos(2*x))); \text{grid}$

(2940)

ck

$x = 31.723$

3. Find the minimum of the function $f(x) = \csc(x) + 1/(1-x)^2$ on the interval $(0, 1)$.

$x = \text{linspace}(0,1) \; ; \; \text{plot}(x, 1./\sin(x) + 1./((1-x).^2)) \; ; \; \text{grid}$

$(0, 0.9)$

etc

$x = 0.359$

4. Write the m-file for function $f(x) = \sin^2(3x)$.

```
function y=f(x)
    y = sin(3*x).^2;
end
```

5. Use newtons method to find a solution to $3e^{-3x} = x$.

$$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)} = x_n - \frac{3e^{-3x} - x}{-9e^{-3x} - 1}$$

$$x = 1$$
$$\vdots$$
$$x = 0.59597$$

6. Use the roots command to find all the roots of $3x^4 - 6x^2 - 4 = 0$. How many real roots are there?

roots([3 0 -6 0 -4])

-1.5898

1.5891

$0.7265i$

$-0.7265i$

two real roots.