Name: James Holden
TA Name: Alvaro Ruiz Martinez
Section: D07
Time: 8pm

Matlab Assignment 1

1. **Exercise 1.1**
    a. What is the date of your Matlab quiz? What day of the week is that?
        i. Thursday, Dec 7, 2017.
    b. What time is your Matlab quiz?
        i. 8:00 pm
    c. Where is your Matlab quiz?
        i. AP&M B342
    d. When does registration for an alternative time close? If you miss the deadline, will you be able to sign up for an alternative time if there are still spots available at that time?
        i. Alternate quiz times signups close at noon on Saturday of week 9.
        ii. If you miss the deadline there is not makeup nor are there spots available at that time.
    e. If you miss the quiz for any reason other than an emergency, will you be able to make it up?
        i. No.
    f. At the top of this page, make sure to include your name, your TA's name, and your section number and time.
        i. I did.
2. **Exercise 1.2**

```
>> (log(20))/(log(8))

ans =

1.4406
```

3. **Exercise 1.3**
    a. Command m = -3:0.4:12 seems to display numbers from -3 to 12, incremented by the value 0.4.
    b. Matlab returns 7 when you type m(26).

4. **Exercise 1.4**

```
>> z = 25-(100-7exp(5+cos(pi/3))
 z = 25-(100-7exp(5+cos(pi/3))
           ↑
Error: Unexpected MATLAB operator.

>> z = 25 - (100 - 7 * (exp(5 + cos(pi/3))))

z =

   1.6378e+03

>>
```

5. **Exercise 1.5**
    a. How do you find arcsin(1) using matlab? [Hint: Start by looking at help sin, or perhaps doc arcsine.]

```
>> asin(1)

ans =

    1.5708
```

6. **Exercise 1.6**
    a. Recall that a geometric sequence is a sequence of the form a, ar, ar2, ar3, …. At the MATLAB command prompt (not in an M-File), create a for loop that prints the first seven terms of this sequence when r=1⁄3 and a=1. Include the output in your Word document.

Code:

```
>> for i = 0:6
(1) * (1/3)^i
end
```

Output:

```
ans =

     1
```

ans =

0.3333

ans =

0.1111

ans =

0.0370

ans =

0.0123

ans =

0.0041

ans =

0.0014

b. Create a new M-File named "geomSeq" with the loop above. Be sure to test it to make sure it works! Include the code for your M-File in your Word document.

Code:

```
function geomSeq;
for i = 0:6;
(1) * (1/3)^i
end
```

```
>> geomSeq

ans =

     1


ans =

    0.3333


ans =

    0.1111


ans =

    0.0370


ans =

    0.0123


ans =

    0.0041


ans =

    0.0014
```

c. Modify your M-File so that it accepts the value of r as an argument. Use this to find the first seven terms of the geometric sequence when r=1/4. Include the output and the code you used in your Word document.

Code:

```
function geomSeq(r);
for i = 0:6;
(1) * (r)^i
end
```

Output:

```
>> geomSeq(1/4)

ans =

     1


ans =

    0.2500


ans =

    0.0625


ans =

    0.0156


ans =

    0.0039


ans =
```

```
  9.7656e-04


ans =

  2.4414e-04

>>
```

7. **Exercise 1.7**
    a. Consider the series 1 + 1⁄r + 1⁄r2 + 1⁄r3 + … + 1⁄rn. Implement a calculation for this series in a new M-file, calling the function "mysum". The function should take two inputs, r and n. Copy the code from your new M-file into your document.

Code:

```
function sum = mysum(r, n)
sum = 0;
for i = 0:n;
   sum = sum + (1/(r^i));
end
```

    b. Use the new command, mysum, to calculate the values when r = 3 and n = 12.

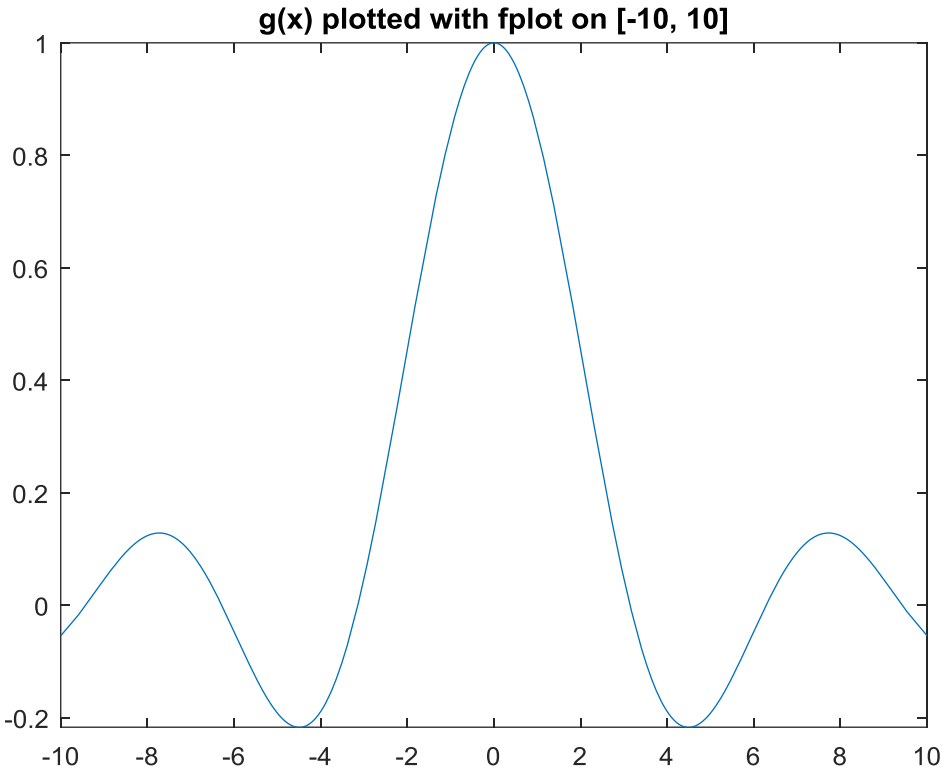
```
>> mysum(3,12)

ans =

   1.5000

>>
```

8. **Exercise 1.8**
    a. Graph the function g(x) = sin(x)⁄x on the interval [-10,10] with fplot. Include the MATLAB code you used. Then paste the graph into your word document. To copy the graph, bring its window to the front and choose the menu option Edit ❯ Copy Figure.



9. **Exercise 1.9**
    a. Compute the derivative of ln(sin(s)+cos(t)) with respect to t. Next, differentiate the same function with respect to s instead. Include the input and output in your Word document.

Differentiation with respect to t.

```
>> syms s t
>> diff( log(sin(s) + cos(t)), t)

ans =

-sin(t)/(cos(t) + sin(s))
```

Differentiation with respect to s:

```
>> diff( log(sin(s) + cos(t)), s)

ans =

cos(s)/(cos(t) + sin(s))
```

10. Exercise 1.10

a. Consider the differential equation dy/dt = sin(t). Solve this equation by hand, without using MATLAB. [Hint: Just integrate both sides.] Write down the solution in your document.

Dy/dt = sin(t)
y = -cos(t) + c where c is an arbitrary constant

b. Now use dsolve to solve the differential equation.

```
>> dsolve('Dy=sin(t)')

ans =

C5 - cos(t)
```

c. Using dsolve, solve the differential equation with initial condition y(0) = 3.

```
>> dsolve('Dy=sin(t)', "y(0)=3")

ans =

4 - cos(t)
```

11. Exercise 1.11

a. Make up a differential equation that dsolve cannot solve. You should receive a warning message saying "explicit solution could not be found." [Hint: You may need to experiment a little until you find such an equation. Try putting complicated functions of y and t on the right-hand side. You may find some of the functions used earlier in this lab useful here.]

Copy and paste to your word document only the input and output for the equation you find that can't be solved. We do not need to see all of your experimentation.

```
>> dsolve('Dy = -exp(y + t)/(t * exp( y + 2) - sec(y))', "t")
Warning: Explicit solution could not be found.
> In dsolve (line 201)

ans =

[ empty sym ]
```