Matlab Homework Problem Set 0

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Your Name

Problem 0

Warm-up, use matlab to compute 1+1. You need to write down the question down.

```
1+1 % Remember to comment your code.

% In the next two sections, I will solve a couple problems from Set A
% to illustrate what I want from you guys.
```

```
ans =

     2
```

Problem A.1

Evaluate:

(a) $\frac{413}{768+295}$ (as a decimal),

```
413/(768+295) % If the code is almost self explanatory, then you may
 leave it.
% Note: I used something called LaTeX to display the fraction in above
 question.
```

```
ans =

   413/1063
```

(b) 2^{123}, both as an approximate number in scientific notation and as an exact integer,

```
2^123 % This returns an approximate number in scientific notation.

round(vpa(2^123)) % From the output of the above line of code, we know
 there
% are 38 digits. So using vpa with 38 digit of precision, we are able
 to
```

```
% obtain the exact integer presentation of 2^123. The round recast
 output from
% a decimal to an integer.


ans =

10633823966279326983230456482242756608


ans =

10633823966279326983230456482242756608
```

(c) π^2 and e to 35 digits,

```
vpa(pi^2, 35) % Self explanatory.

vpa(exp(1), 35) % The trick here is to use exp(1) in place of e.


ans =

9.8696044010893579923049401259049773


ans =

2.7182818284590455348848081484902650
```

(d) the fractions $\frac{61}{88}$, $\frac{13863}{20000}$, and $\frac{253}{365}$, and determine which is the best approximation to $\ln(2)$.

```
61/88, 13863/20000, 253/365 % Self explanatory

Error1 = abs(vpa(log(2)-61/88, 1000)) % Finding the error of the first
 approximation.

Error2 = abs(vpa(log(2) -13863/20000, 1000)) %  Finding the error of
 the second approximation.

Error3 = abs(vpa(log(2) - 253/365, 1000)) %  Finding the error of the
 third approximation.

% Clearly from the outputs, we see that the second approximation is
 the
% best approximation out of the three approximation.


ans =

      61/88
```

```
ans =

     253/365


ans =

     253/365


Error1 =

0.000034637621872946056100772693753242


Error2 =

0.0000028194400547576492499501910060644


Error3 =

0.0000035043715616023263237366336397827
```

Problem A.11

Alice solved (b); Bob commented the code and checked the Alice and Charlies's solutions; Charlie solved (b).

(a) Use solve to simultaneously solve the pair of equations $x^2 - y^2 = 1, 2x + y = 2$.

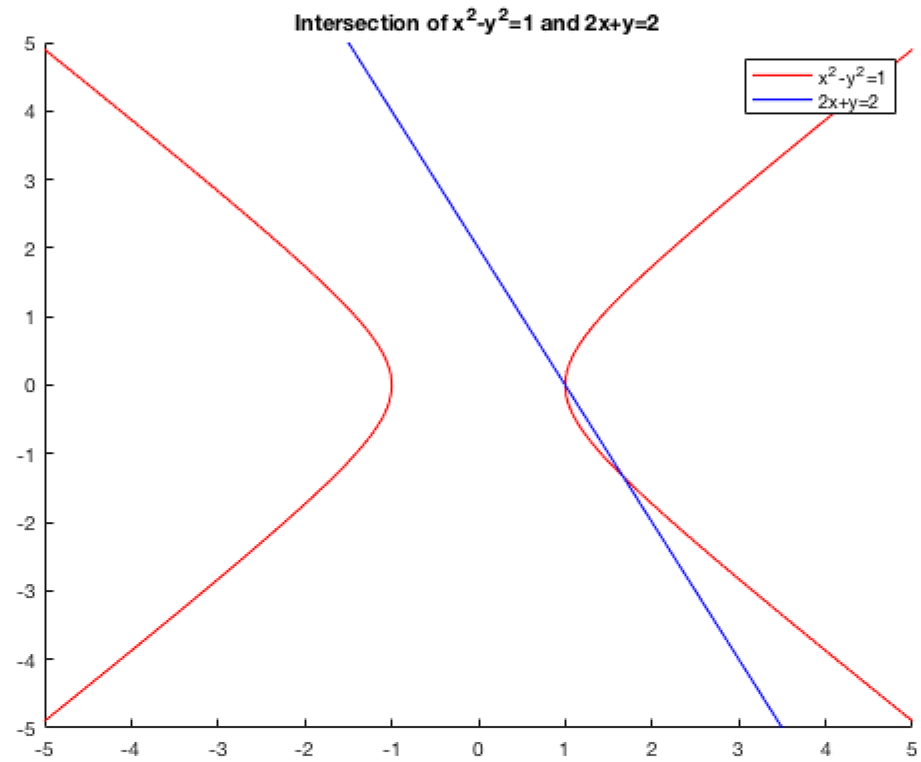
```
syms x y
[x, y] = solve(x^2-y^2==1, 2*x+y==2) % Using the solve function to
% find all the solutions the the pair of equations. Note, the are two
% solutions (1, 0) and (5/3, -4/3).
```

```
x =

   1
 5/3


y =

    0
 -4/3
```

Use fimplicit to plot the two curves on the same graph and visually corroborate your answer from part (a).

```
figure
hold on % This allows us to graph multiple equations on the same plot.
h1 = fimplicit(@(x,y) x.^2 - y.^2 - 1) % Using fimplicit to plot x^2-
y^2=1
h2 = fimplicit(@(x, y) 2*x+y-2) % Using fimplicit to plot 2x+y = 2
hold off

set(h1, 'color', 'r') % Setting the color of the curve x^2-y^2=1 red
set(h2, 'color', 'b') % Setting the color of the curve 2x+y =2 blue
legend('x^2-y^2=1', '2x+y=2') % displaying the legend

title('Intersection of x^2-y^2=1 and 2x+y=2')

hold off
% Based on the graph, we see that the solutions from part (a) indeed
% match the visual outcome from part (b).
```

```
h1 =

  ImplicitFunctionLine with properties:

     Function: @(x,y)x.^2-y.^2-1
        Color: [0 0.4470 0.7410]
    LineStyle: '-'
    LineWidth: 0.5000

  Use GET to show all properties


h2 =

  ImplicitFunctionLine with properties:

     Function: @(x,y)2*x+y-2
        Color: [0.8500 0.3250 0.0980]
    LineStyle: '-'
    LineWidth: 0.5000

  Use GET to show all properties
```



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