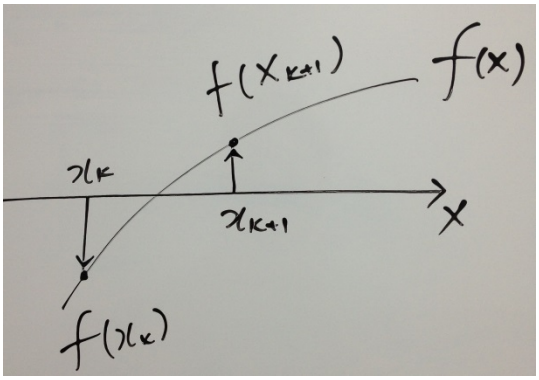
MATLAB HOMEWORK

made by Seungchul Lee

P1 Here, we'd like to numerically find the solutions (roots) of the following equation

$$f(x) = 4x^3 + 10x^2 - 20x - 10 \quad \text{for} \quad -4 \le x \le 3$$

1) Plot $f(x)$ over $-4 \le x \le 3$



2) Numerically find all the roots (solutions) of $f(x) = 0$ with a hint of the above figure.

P2 In this problem, we want to repeat P1 with the following equation

$$f(x) = x^2 - 5x - 14 \quad \text{for} \quad -4 \le x \le 10$$

1) Plot $f(x)$ over $-4 \le x \le 10$

2) Use 'syms' to calculate the analytical solutions of $f(x) = 0$

3) Numerically find all the roots (solutions) of $f(x) = 0$ and compare them with

$f(x) = x^2 - 5x - 14 = (x+2)(x-7) = 0$

4) Type the following two lines of m-code and execute them to understand 'roots' command

```
p = [1 -5 -14];
x = roots(p)
```

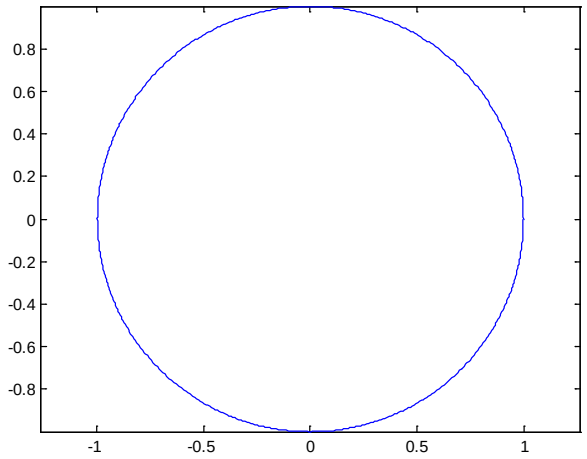
P3 Run the following m-code which explains how to make a kind of animation effect in Matlab.

```
figure(1);  hold on
axis([-1 1 -4 .5])
for x = -1:0.05:1
    y = -4*x^2;
    plot(x,y,'s')
    pause(0.1)
end
hold off
```

```
figure(2);  hold on
axis([0 2*pi -1 1])

x = 0:0.01:2*pi;
for i = 1:10
    y = 1/i*sin(x);
%     cla
    plot(x,y)
    pause(0.5)
end
hold off
```

P4 Write a m-code to create a circle as shown in the below figure. (hint: there are many ways to realize this problem, but think about Euler's formula (http://en.wikipedia.org/wiki/Euler's_formula))



P5 Create an animation which the green dot is moving around the unit circle (counter clockwise).