ME 535 Homework Assignment No 1

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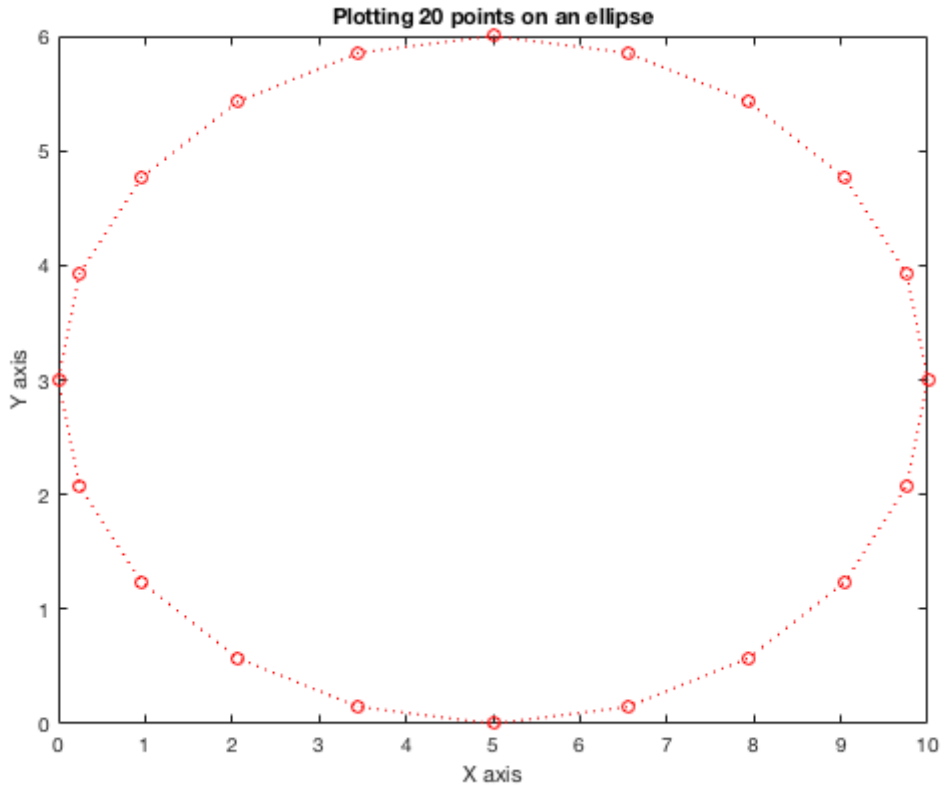
Question 1: (Exercise 1.1)

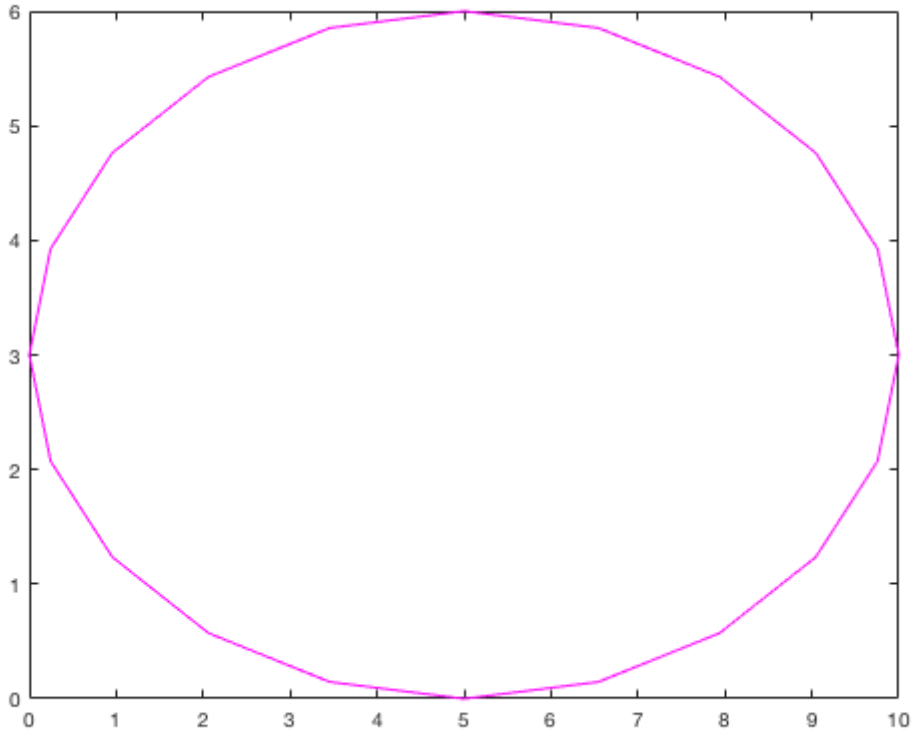
a. Draw 20 points on an ellipse

```
theta = 0:pi/10:2*pi;
x = 5 + 5*cos(theta);
y = 3 + 3*sin(theta);
plot(x,y,'r:o')
xlabel("X axis")
ylabel("Y axis")
title("Plotting 20 points on an ellipse")
```



b. Draw a polygon connecting the above points

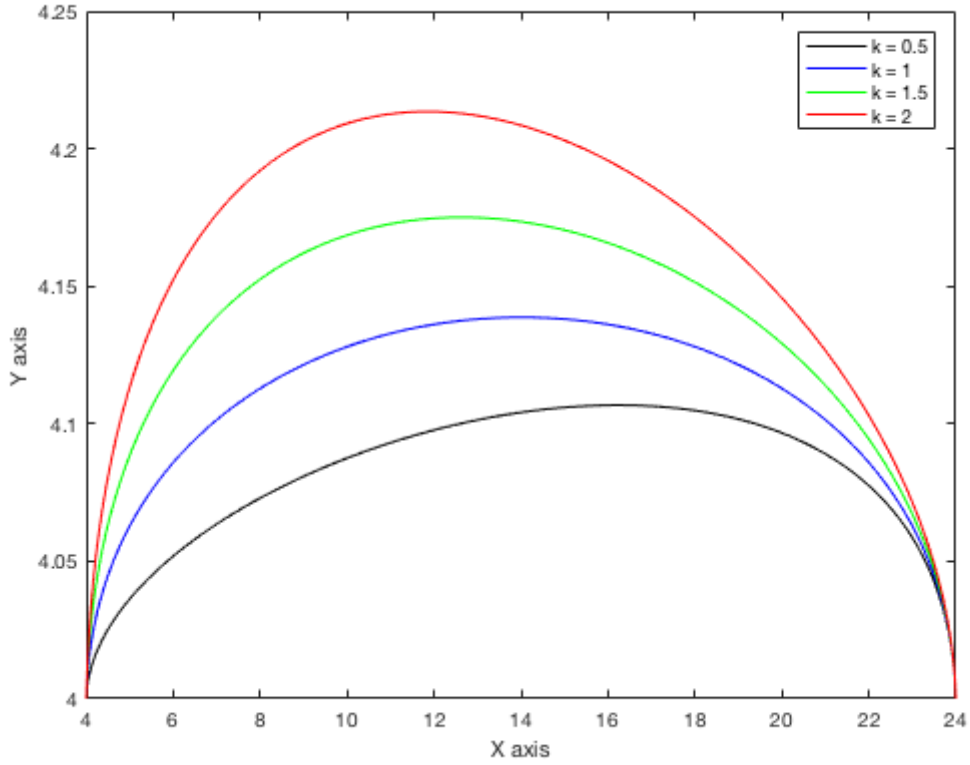
```
plot(x,y,'m')
```



Question 2: (Exercise 2.1)

Demonstrate how unequal tangent vector magnitude with the symmetric slope end condition would affect the resulting Hermite curves for the following coefficients, where k = 0.5,1,1.5 and 2. Display the results graphically.

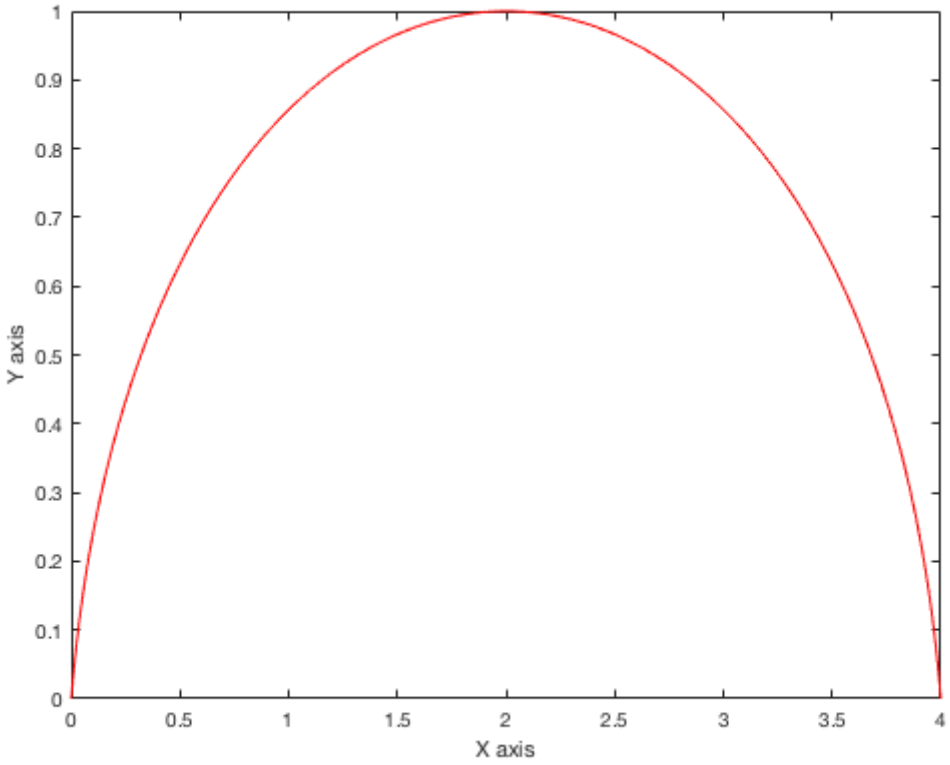
```
k = [0.5 1 1.5 2];
figure(1); cla;
colorstring = 'kbgr';
u = 0:0.01:1;
for i = 1:size(k,2)
p = [4 4 0;24 4 0;0.8320*k(i) 0.5547*k(i) 0;0.8320 -0.5547 0];
for j = 1:size(u,2)
g = [u(j)^3 u(j)^2 u(j) 1];
A = [2 -2 1 1; -3 3 -2 -1; 0 0 1 0; 1 0 0 0];
x(j) = g*A*p(:,1);
y(j) = g*A*p(:,2);
end
plot(x,y, 'Color', colorstring(i))
xlabel("X axis")
ylabel("Y axis")
hold on
end
legend("k = 0.5","k = 1","k = 1.5","k = 2")
hold off
```



Question 3: (Exercise 2.2)

A Hermite curve is defined by two points. What is the equation for the curve, i.e. the polynomial form? Plot the curve.

```
n = 100;
m = 1/(n-1);
t = 0:m:1;
x = -6*t.^3 + 9*t.^2 + t;
y = -4*t.^2 + 4*t;
plot(x,y,'r')
xlabel("X axis")
ylabel("Y axis")
```


Y axis
X axis
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
0
0.5
1
1.5
2
2.5
3
3.5
4