Math 320 – Assignment 1
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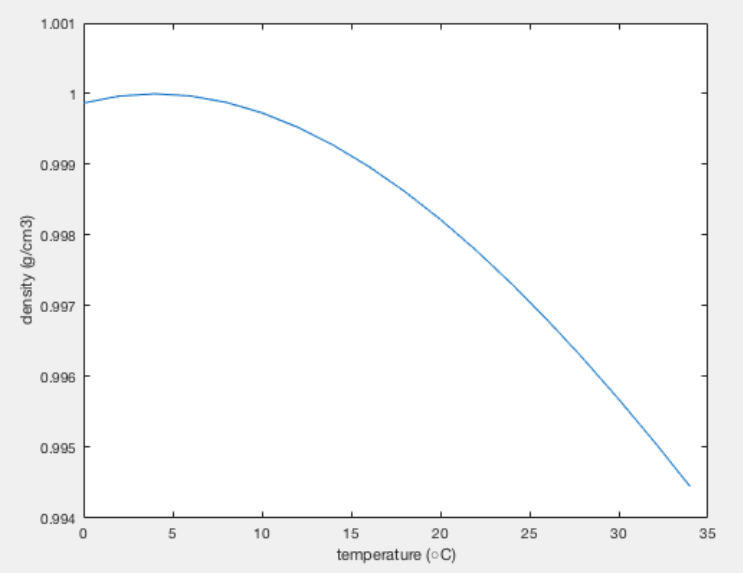
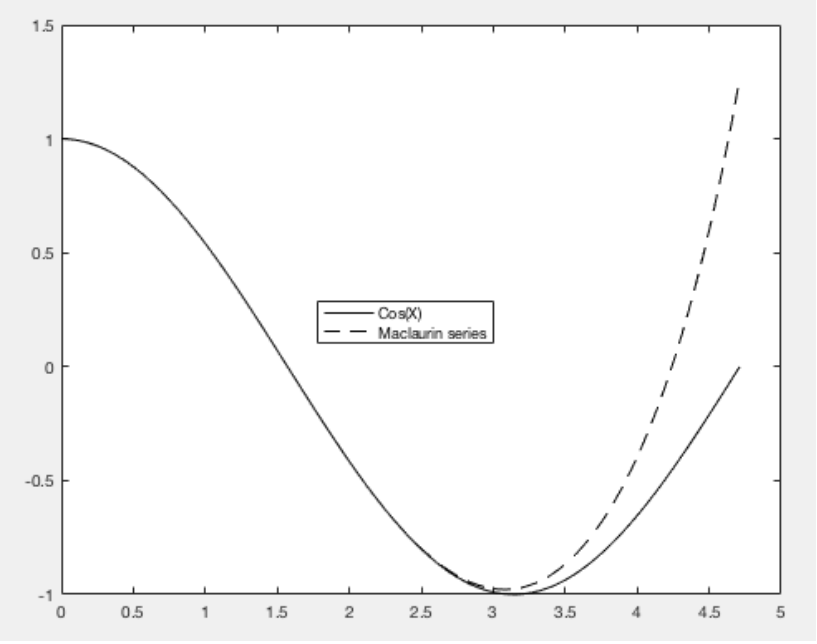
Question 1

```
v1 = 32:3.6:93.2
% Create TF vector from 32 degrees F to 93.2 degrees F in steps of 3.6
v2 = (5/9)*(v1-32)
% Create a TC vector
v3 = 5.5289*(10^(-8))*((v2).^3)-8.5016*(10^(-
6))*((v2).^2)+6.5622*(10^(-5))*(v2)+0.99987
% Apply the density formula to the TC vector
plot(v2, v3)
% Plot
```



Question 2

```
x = 0:pi/50:3*pi/2
% Create a x-range vector from 0 to 3pi/2 with small steps of pi/50
y = cos(x)
% Cosine of x
y2 = 1-(x.^2)/factorial(2)+(x.^4)/factorial(4)-
(x.^6)/factorial(6)+(x.^8)/factorial(8)
% the McLaurin series expansion
plot(x,y,'k')
% Plot of x and cos(x)
hold on
% Place both lines in the same plot
plot(x,y2,'--k')
% Plot of x and the McLaurin series expansion
```



Question 3

*separate mfile

```
function[theta, r] = polar(x,y)
% This function takes the horizontal and vertical distances in
Cartesion
% coordinates to and computes its corresponding polar coordinates
based on the various cases of x and y.
% Input:
%   x = x-value
%   y = y-value
% Output:
%   theta = angle
%   r = radius
if (x < 0)
    if (y > 0);
        theta1 = atan(y/x)+pi;
    elseif (y < 0);
        theta1 = atan(y/x)-pi;
    else
        theta1 = pi;
    end
elseif (x == 0)
    if (y > 0);
        theta1 = pi/2;
    elseif (y < 0);
        theta1 = -pi/2;
    else
        theta1 = 0;
    end
else
    theta1 = atan(y/x);
end
```

```
theta = theta1*100
r = sqrt(x^2 + y^2);
end
```

*call [theta, r] = polar(x,y)

x	y	r	theta
2	0	2	0
2	1	2.236	46.365
0	3	3	157.080
-3	1	3.162	281.984
-2	0	2	314.159
-1	-2	2.236	-203.444
0	0	0	0
0	-2	2	-157.080
2	2	2.828	78.540

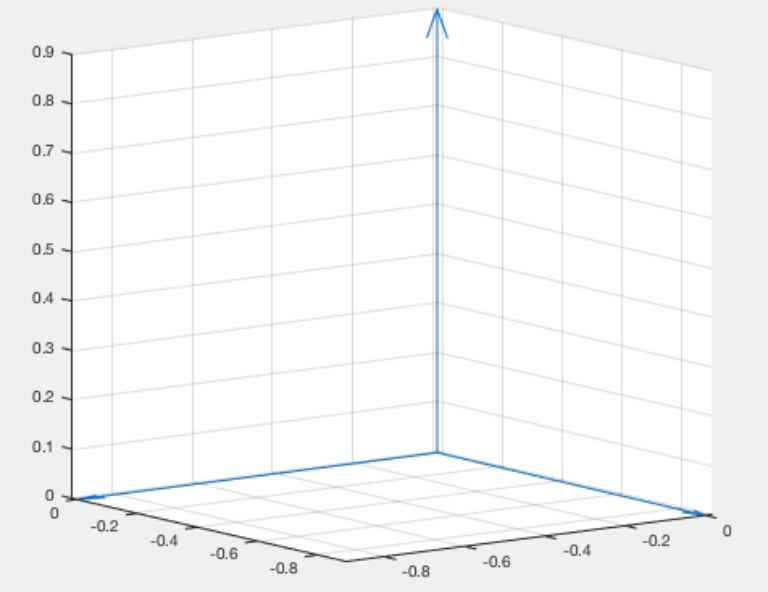
Question 4

*Separate mfile

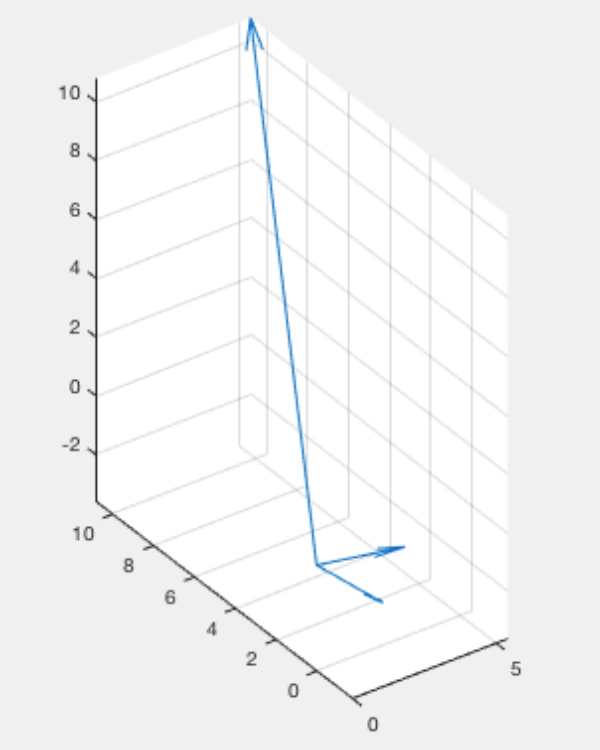
```
function [theta, c, magc] = cartvector(a, b)
% This function takes two vectors, calculates the angle between them,
its cross product
% (perpendicular to the plane created by vectors a, b), and the
magnitude
% of this cross product. After running these calculations, the
function
% also creates a plot of the the three vectors.
% Input:
%   a = assigned vector a
%   b = assigned vector b
% Output:
%   theta = angle between vectors a, b
%   c = vector c, which is the cross product of vectors a, b
%   magc = magnitude of c
theta = atan2d(norm(cross(a,b)),dot(a,b));
c = cross(a,b);
magc = norm(c);
starts = zeros(3,3);
ends = [a;b;c];
quiver3(starts(:,1), starts(:,2), starts(:,3), ends(:,1), ends(:,2),
ends(:,3))
axis equal
end
```

*call [theta, c, magc] = cartvector(a, b)

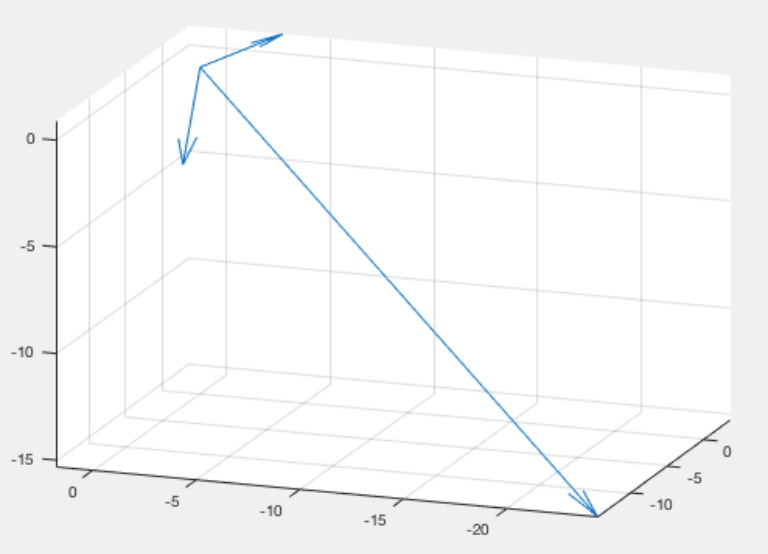
a) theta = 38.2132; c = [4 -20 28]; magnitude of c = 34.6410



b) theta = 90; c = [-16 -27 -17]; magnitude of c = 35.6931



c) theta = 90; c = [6 12 12]; magnitude of c = 18



d) theta = 90; c = [0 0 1]; magnitude of c = 1