

## Code: HW1.m

```
% Kevin You
% Math 320
% Homework 1

% Question 1 (2.9)
Tf = 32:3.6:93.2;
Tc = 5/9*(Tf-32);
p = 5.5289 * 10^(-8) * Tc.^3 - 8.5016 * 10^(-6) * Tc.^2 + 6.5622 *
10^(-5) * Tc + 0.99987;
p
plot(Tc,p);
title('Plot of Tc vs Density')
xlabel('Temperature (Celsius)')
ylabel('Density (g/cm^3)')

% Question 2 (2.15)
x = linspace(0,3*pi/2);
y = cos(x);
z = 1 - x.^2/2 + x.^4/factorial(4) - x.^6/factorial(6) +
x.^8/factorial(8);
plot(x,y,x,z,'--');

% Question 3 (3.6)
% Function saved in q3.m
x = [2 2 0 -3 -2 -1 0 0 2];
y = [0 1 3 1 0 -2 0 -2 2];
q3(x,y);

% Question 4 (3.20)
% Function saved in q4.m
% 4a
a = [6 4 2];
b = [2 6 4];
q4(a,b);
% 4b
a = [3 2 -6];
b = [4 -3 1];
q4(a,b);
% 4c
a = [2 -2 1];
b = [4 2 -4];
q4(a,b);
% 4d
a = [-1 0 0];
b = [0 -1 0];
q4(a,b);
```

### Code: q3.m

```
function t = q3(x,y)
r = sqrt(x.^2 + y.^2);
for i = 1:length(x)
    if x(i) < 0
        if y(i) < 0
            t(i) = atan(y(i)/x(i)) - pi;
        elseif y(i) > 0
            t(i) = atan(y(i)/x(i)) + pi;
        else
            t(i) = pi;
        end
    else
        if y(i) < 0
            t(i) = -pi/2;
        elseif y(i) > 0
            t(i) = pi/2;
        else
            t(i) = 0;
        end
    end
    t(i) = t(i)*180/pi;
end
output = [x;y;r;t];
fprintf('\n      x      y      radius  angle\n');
fprintf('%8.2f %8.2f %8.2f %8.2f\n',output);
```

### Code: q4.m

```
function th = q4(a,b)
c = cross(a,b)
magc = norm(c)
intermed = dot(a,b) / (norm(a) * norm(b));
th = acos(intermed)

starts = zeros(3,3);
ends = [a;b;c];

quiver3(starts(1,1), starts(1,2), starts(1,3), ends(1,1), ends(1,2),
ends(1,3),0,'LineStyle','--');
hold on
quiver3(starts(2,1), starts(2,2), starts(2,3), ends(2,1), ends(2,2),
ends(2,3),0,'LineStyle','--');
hold on
quiver3(starts(3,1), starts(3,2), starts(3,3), ends(3,1), ends(3,2),
ends(3,3),0);
hold off
end
```

## Output: Question 1

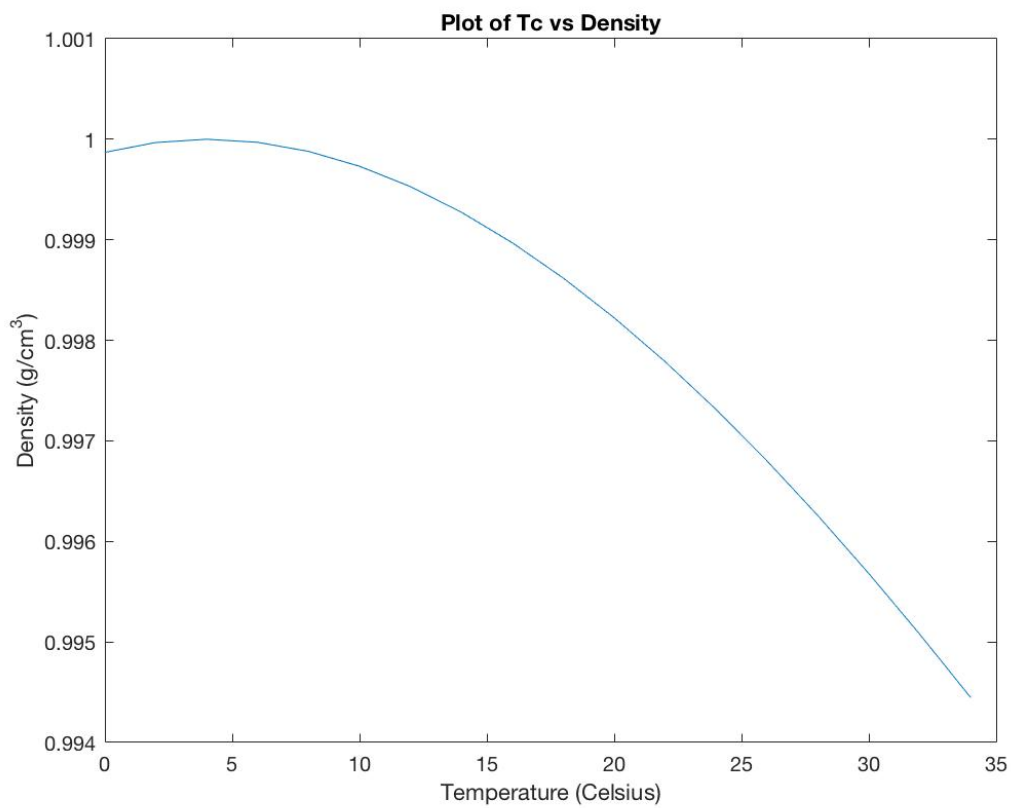
p =

Columns 1 through 10

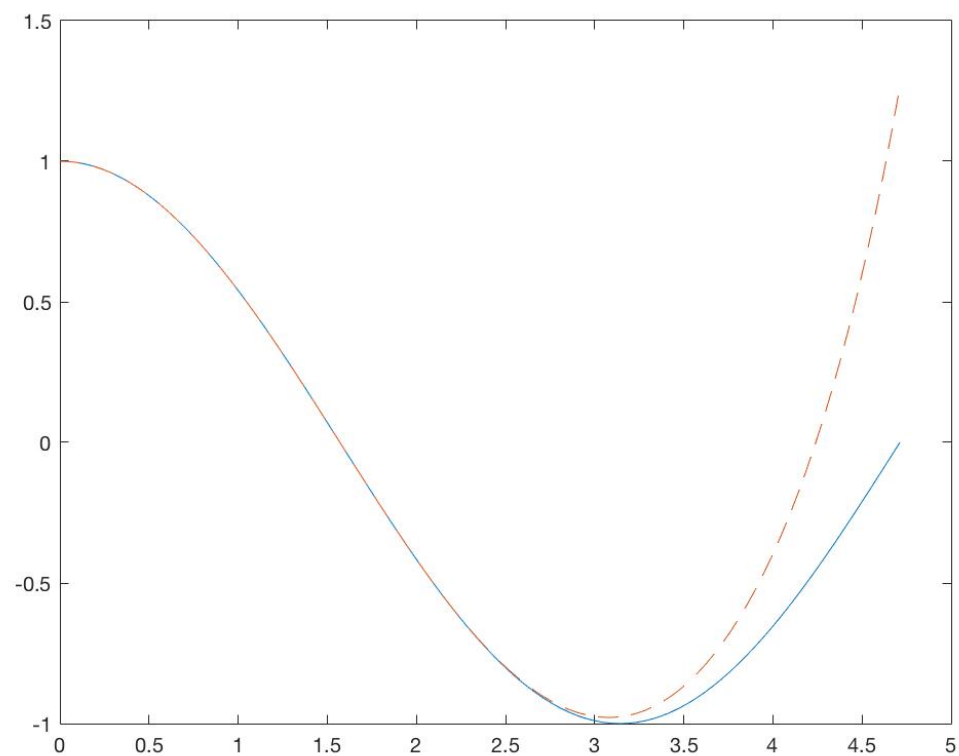
0.9999 1.0000 1.0000 1.0000 0.9999 0.9997 0.9995 0.9993 0.9990  
0.9986

Columns 11 through 18

0.9982 0.9978 0.9973 0.9968 0.9963 0.9957 0.9951 0.9944



**Output: Question 2**

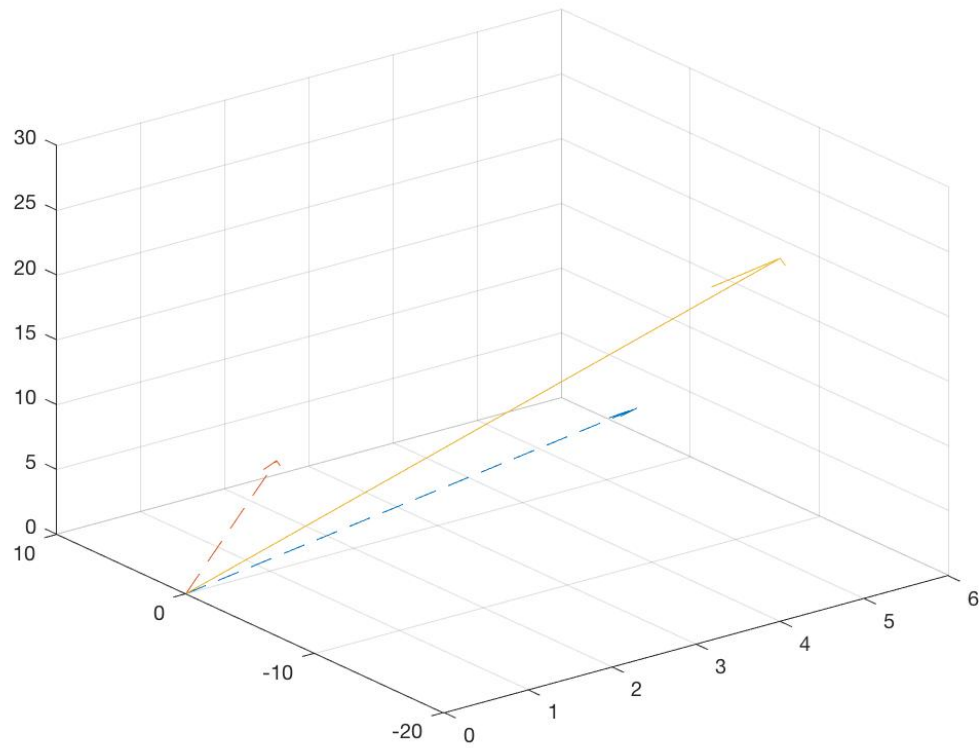


**Output: Question 3**

x	y	radius	angle
2.00	0.00	2.00	0.00
2.00	1.00	2.24	90.00
0.00	3.00	3.00	90.00
-3.00	1.00	3.16	161.57
-2.00	0.00	2.00	180.00
-1.00	-2.00	2.24	-116.57
0.00	0.00	0.00	0.00
0.00	-2.00	2.00	-90.00
2.00	2.00	2.83	90.00

## Output: Question 4

4(a)



`c =`

`4 -20 28`

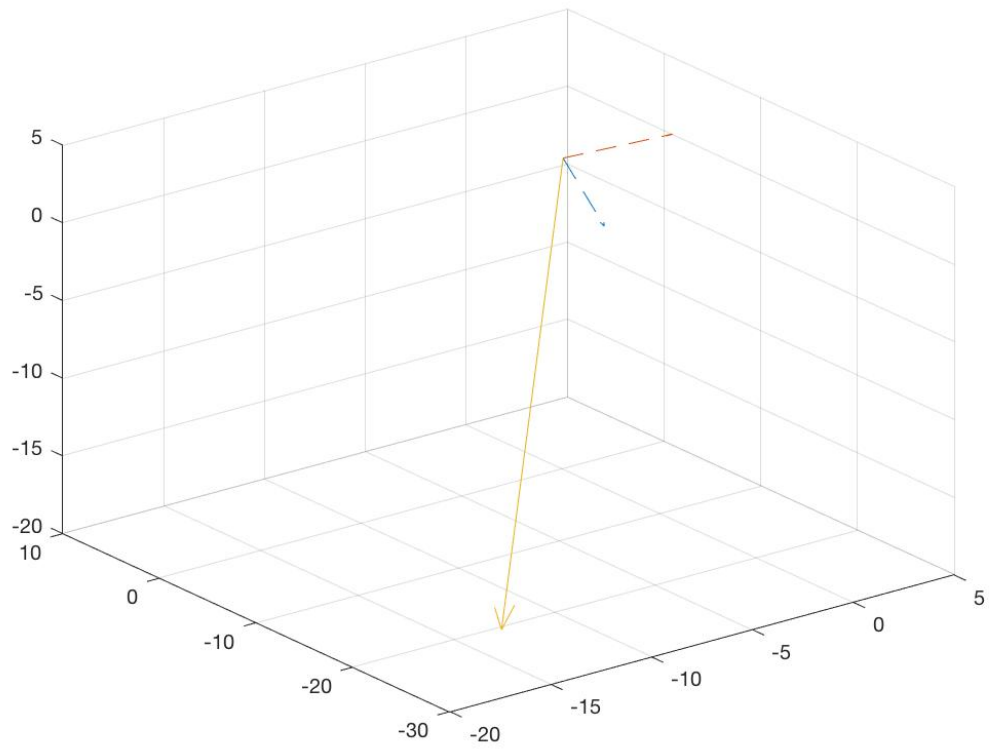
`magc =`

`34.6410`

`th =`

`0.6669`

4(b)



$\mathbf{c} =$

-16 -27 -17

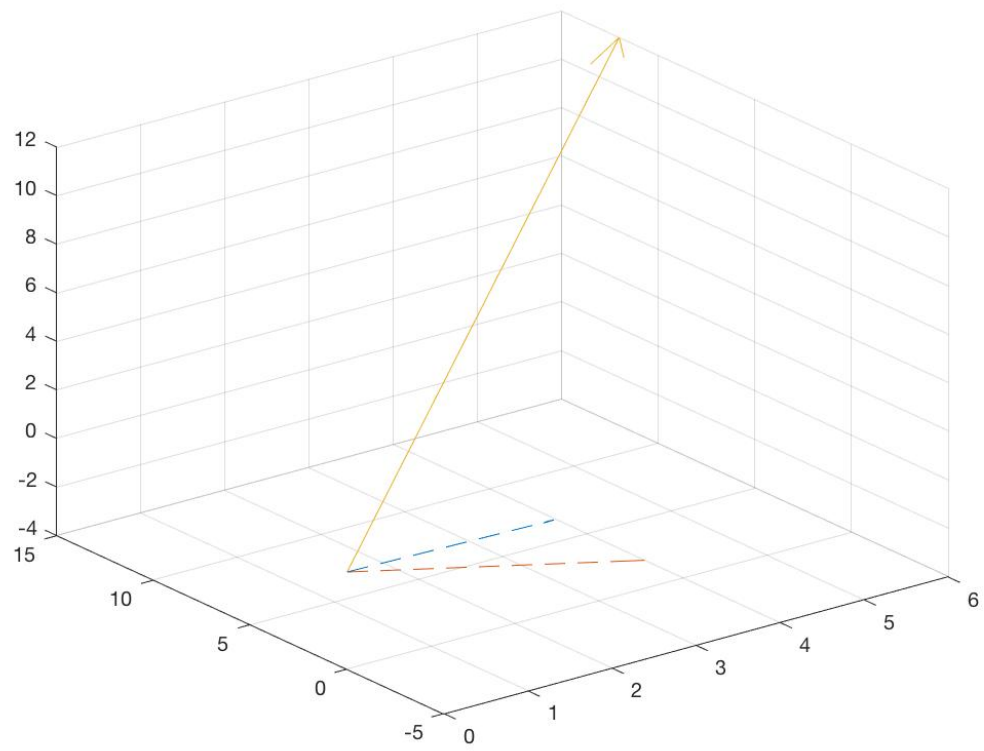
$\text{magc} =$

35.6931

$\text{th} =$

1.5708

4(c)



$\mathbf{c} =$

$\begin{bmatrix} 6 \\ 12 \\ 12 \end{bmatrix}$

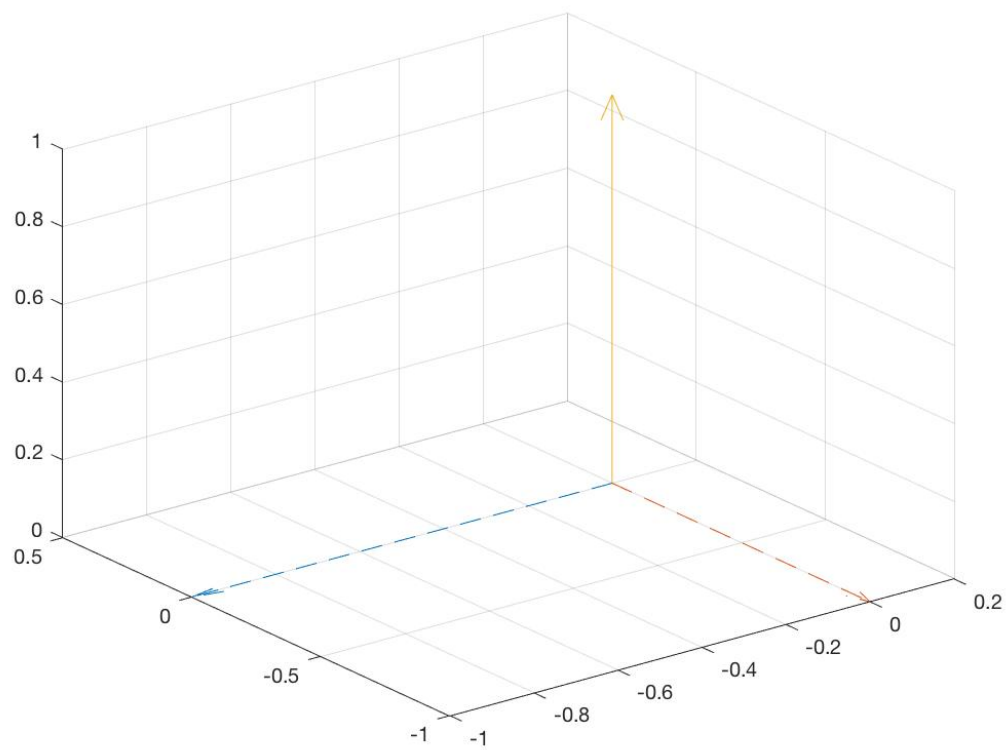
$\text{magc} =$

18

$\text{th} =$

1.5708

4(d)



$\mathbf{c} =$

$\begin{bmatrix} 0 & 0 & 1 \end{bmatrix}$

$\text{magc} =$

1

$\text{th} =$

1.5708