WILL TIRONE

LAB 1

MAT 275

Exercise 1

Question 1

```matlab
format short
theta = [0, pi/5, pi/3, pi/2, (3*pi)/2, (4*pi)/3, (5*pi)/4];
r = 4;
x = r .* cos(theta);
y = r .* sin(theta);
radius = sqrt(x.^2 + y.^2)
```

```
radius = 1×7
     4     4     4     4     4     4     4
```
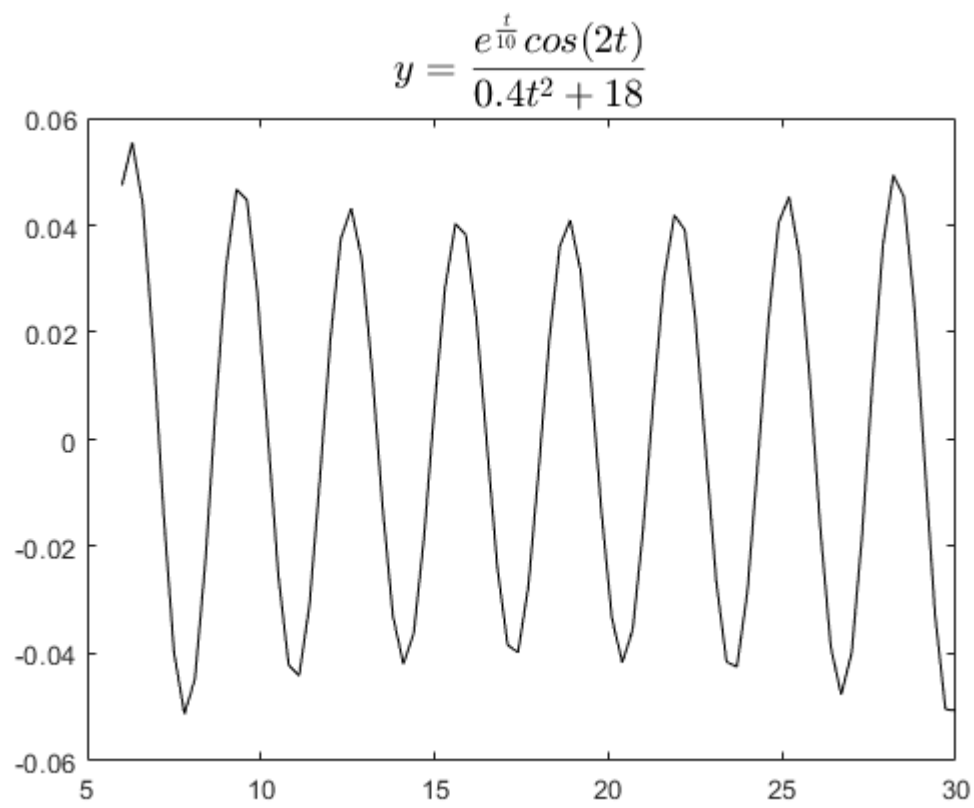
```matlab
radius == r
```

```
ans = 1×7 logical array
   1   1   1   1   1   1   1
```
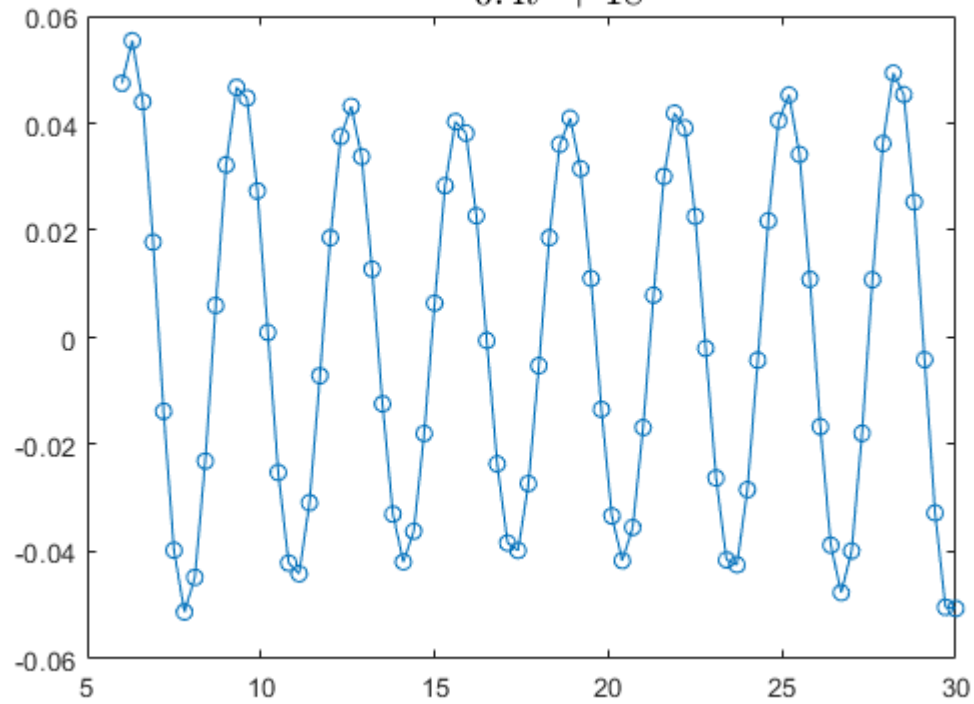

Question 2

a)

```matlab
t = (6:0.3:30);
y = (exp(t/10) .* cos(2.*t)) ./ (0.4.*t.^2 + 18);
plot(t,y,'k');
title('$$y = \frac{e^{\frac{t}{10}} cos(2t)}{0.4t^2 + 18}$$','interpreter','latex',"FontSize",1
```

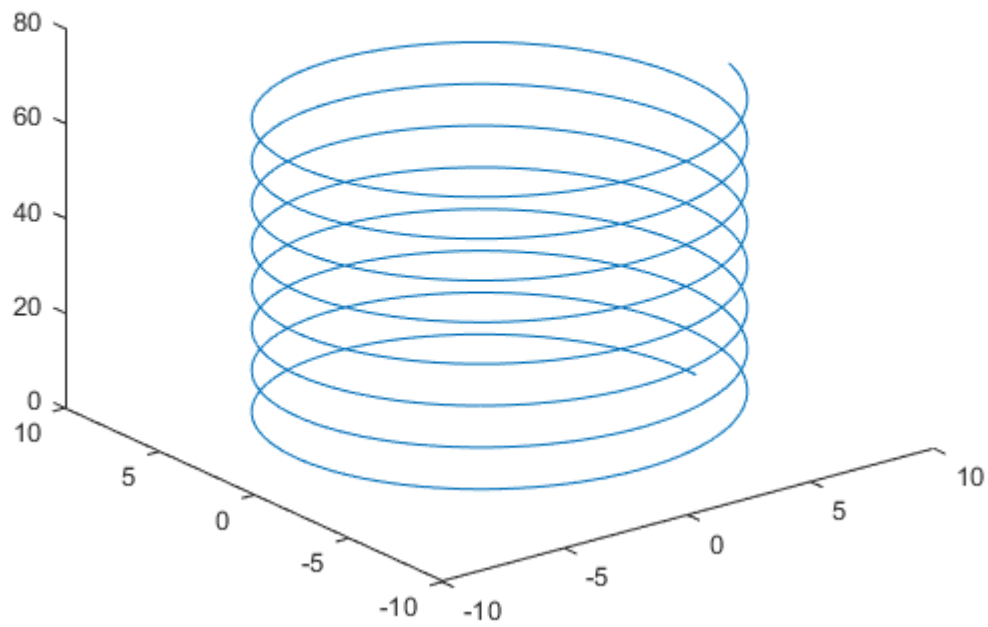$$y = \frac{e^{\frac{t}{10}} \cos(2t)}{0.4t^2 + 18}$$

b)

```
plot(t,y,'o-');
title('$$y = \frac{e^{\frac{t}{10}} cos(2t)}{0.4t^2 + 18}$$','interpreter','latex',"FontSize",1
```

2

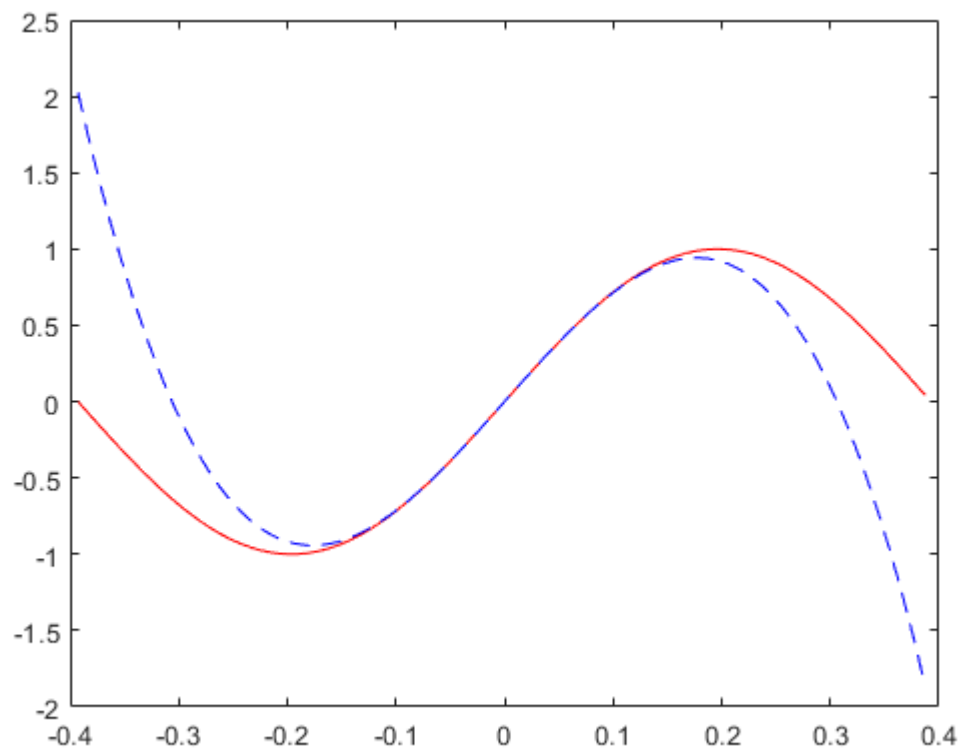$$y = \frac{e^{\frac{t}{10}}\cos(2t)}{0.4t^2 + 18}$$

Question 3

```
t = 0:0.01:10;
x = 8 .* cos(5.*t);
y = 8 .* sin(5.*t);
z = 7 .* t;
plot3(x,y,z)
```

Question 4

```
x = (-pi/8):0.01:(pi/8);
y = sin(8*x);
z = (8.*x) - ((256/3)*x.^3 );
plot(x,y,'r',x,z,'b--')
```
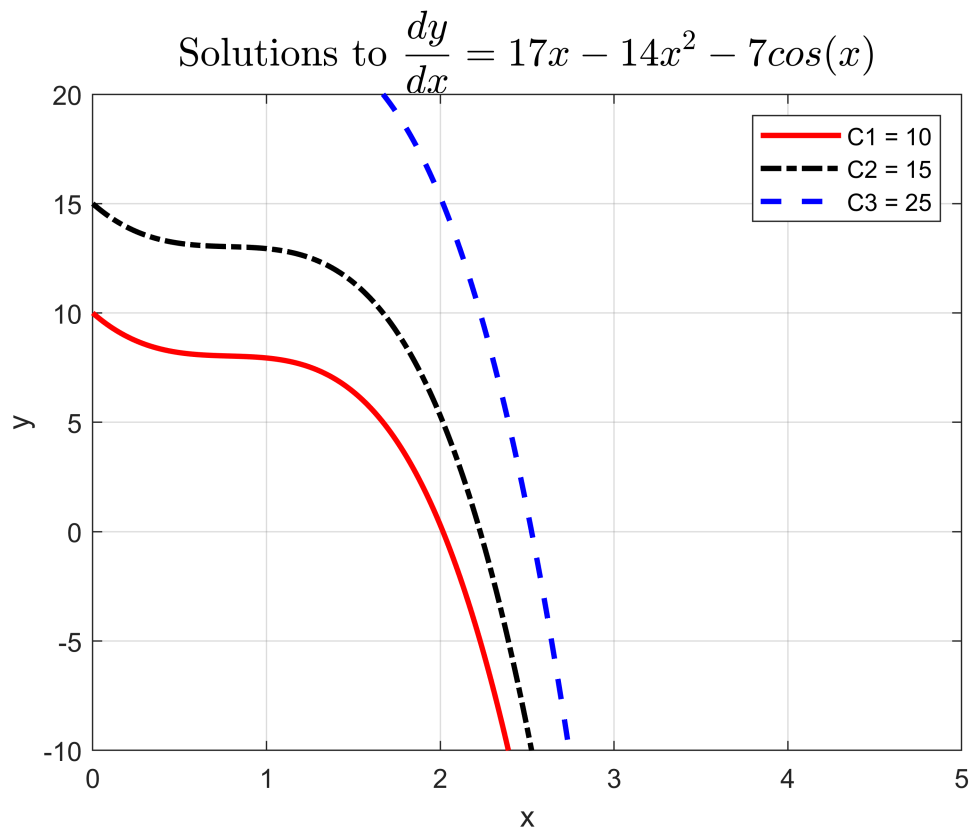
Question 5

```
type ex5.m
```

```
x =0:.01:3;

y1 = f(x,10);
y2 = f(x,15);
y3 = f(x,25);

plot (x,y1,'r-', x, y2, '-.k', x,y3, '--b', 'Linewidth',2);
axis ([0 ,5 , -10 ,20]);
grid on;
title ("Solutions to $$\frac{dy}{dx} = 17x - 14x^2 - 7cos(x)$$",'interpreter','latex',"FontSize",15,"Color",'k');
legend ('C1 = 10', 'C2 = 15', 'C3 = 25')
xlabel ('x'); ylabel ('y');
% ------------------------------
function y= f(x,C)
y=(17/2).*x.^2 - (14/3).*x.^3 - 7.*sin(x) + C;
end
```

```
ex5
```

Solutions to $\frac{dy}{dx} = 17x - 14x^2 - 7\cos(x)$

Question 6

a)

```
g = @(x,y)(((x^4) / (y^2)) + (cos(9*x*exp(8*y)) / ((x^6) + 2)))
```

g = function_handle with value:
    @(x,y)(((x^4)/(y^2))+(cos(9*x*exp(8*y))/((x^6)+2)))

```
g(8,6)
```

ans = 113.7778

b)

```
type g.m
```

```
function eval = g(x,y)
eval = ((x^4) / (y^2)) + (cos(9*x*exp(8*y)) / ((x^6) + 2));
end
```

```
g(8,6)
```

ans = 113.7778