Answer

(4a) Commandwindow

clc

clear all

Close all

Syms n(t)

Cond1 = n(0) == 5

~~Cond2 =~~

D(n) = diff(n,t)

Cond2 = D(n) == -0.5

Ode = diff(n,t,2) - diff(n,t) - 12*n == 144*(t^3) + 125

Conds = [Cond1 Cond2]

nSol(t) = dsolve(Ode, Conds)

t = 0:0.1:1.5

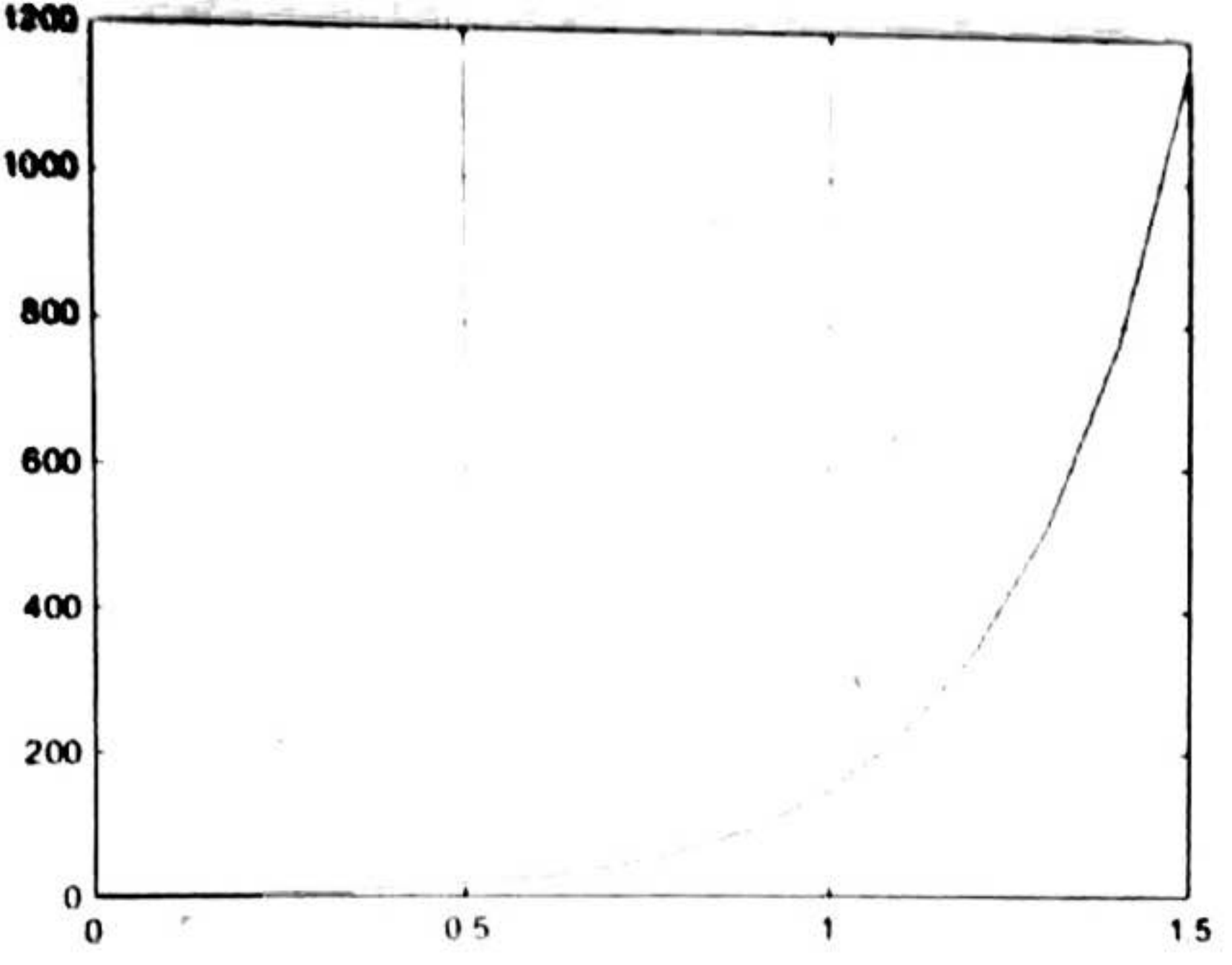
Grab = subs(nSol(t))

fplot(Grab)

grid on

axis tight

legend('Grab' 'Location')


1200
1000
800
600
400
200
0
0
0 5
1
1 5

4b) Commandwindow

```
clc
clear all
Close all
Syms x(t) y(t)
D(x) = diff(x,t)
D(y) = diff(y,t)
Odc1 = [D(y) - 2*x_2= exp(-2^t)]
ode2 = [D(x) + y == exp(-1)]
Odes = [Odc1; Ode2]
Gab = dsolve(odes)
Ysol(t) = Gab.y
Xsol(t) = Gab.x

Visualizing the Solution graphically
fPlot (ysol)
fPlot (xsol)
grid on
legend ('xsol' 'location' 'best')
legend ('ysol' 'location' 'best')
```

Visualizing the solution together

```
figure(x,sol)
hold on
figure(y,sol)
grid on
legend('x sol' 'y sol' 'location' 'best')
```

4c) Command window

```
clc
clear all
close all
syms t, s, w, k, q
y = k^2*exp(-a*t) * sin(5^4*w*t) * cos(3^4*w*t)
f = laplace(y)
simplify(f).
```

ii) Command window

```
clc
clear all
close all
syms t, s, k
G = pi*k / [(s^2 + (15*pi^3)) + 2*(pi^3)]
F = laplace(G)
simplify(F)
```