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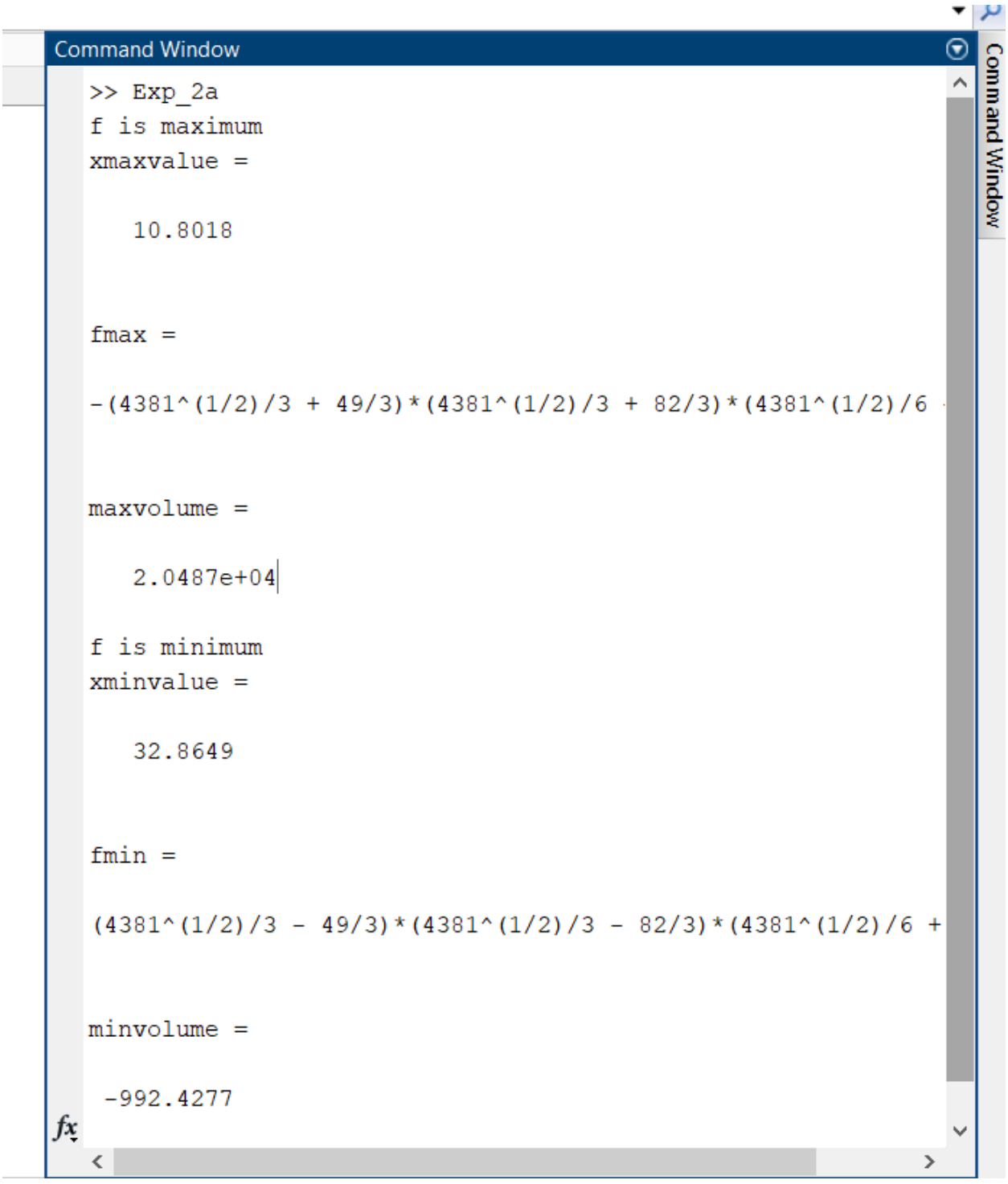
EXPERIMENT NO 2 : APPLICATION OF DERIVATIVES

1.

```
%clc
%clear all
syms x
f=x*(71-2*x)*(60-2*x);
df=diff(f);
roots = solve(df==0);
ddf=diff(df);
ddfval=subs(ddf, x, roots);
for i=1:length(ddfval)
    if ddfval(i)<0
        fprintf('f is maximum')
        xmaxvalue=double(roots(i))
        fmax=subs(f, x, roots(i))
        maxvolume=double(fmax)
    else
        fprintf('f is minimum')
        xminvalue=double(roots(i))
        fmin=subs(f, x, roots(i))
        minvolume=double(fmin)
    end
end
```


Command Window
>> Exp_2a
f is maximum
xmaxvalue =
10.8018
fmax =
-(4381^(1/2)/3 + 49/3)*(4381^(1/2)/3 + 82/3)*(4381^(1/2)/6
maxvolume =
2.0487e+04
f is minimum
xminvalue =
32.8649
fmin =
(4381^(1/2)/3 - 49/3)*(4381^(1/2)/3 - 82/3)*(4381^(1/2)/6 +
minvolume =
-992.4277
Command Window

2 .

```
clc
clear all
syms x y L;
f=(x^2)*y;
diff_f=gradient(f, [x, y]);
fx=diff_f(1);
fy=diff_f(2);
g=(x^2+4*x*y)-60;
diff_g=L*gradient(g, [x, y]);
gx=diff_g(1);
gy=diff_g(2);
eqns=[fx-gx==0,fy-gy==0,g==0];
vars=[x y L]
[sol_x, sol_y, sol_L] = solve(eqns, vars);
xyL_Values= [sol_x(:), sol_y(:), sol_L(:)]
[m,n]=size(xyL_Values);
for i=1:m
    result(i)=subs(f,[x,y,L],xyL_Values(i,:))
end
result;
f_min=min(result);
ind_fmin=find(result==f_min);
f_max=max(result)
ind_fmax=find(result==f_max);
mvar=xyL_Values(ind_fmax,:)
```

```
vars =

[x, y, L]


xyL_Values =

[-2*5^(1/2), -5^(1/2), -5^(1/2)/2]
[ 2*5^(1/2),  5^(1/2),  5^(1/2)/2]


result =

-20*5^(1/2)


result =

[-20*5^(1/2), 20*5^(1/2)]


f_max =

20*5^(1/2)


mvar =

[2*5^(1/2), 5^(1/2), 5^(1/2)/2]
```