

The Answer Of Exam E

1)

a)

b)

```
>>A=[1 6 3;1 2 5];
```

```
>>B=[7 4;5 6;7 9];
```

i.

```
>>A*A'
```

```
ans =
```

```
46 28
```

```
28 30
```

```
>>A*B
```

```
ans =
```

```
58 67
```

```
52 61
```

```
>>A+B'
```

```
ans =
```

```
8 11 10
```

5 8 14

ii.

```
>>tanh(5*A)
```

```
ans =
```

```
0.9999 1.0000 1.0000
```

```
0.9999 1.0000 1.0000
```

```
>>tan(A')
```

```
ans =
```

```
1.5574 1.5574
```

```
-0.2910 -2.1850
```

```
-0.1425 -3.3805
```

```
>>log(abs(B))
```

```
ans =
```

```
1.9459 1.3863
```

```
1.6094 1.7918
```

```
1.9459 2.1972
```

c)

```
>>diff('sin(x)*exp(4*x)*log(x^3)')
```

ans =

$\cos(x) \cdot \exp(4 \cdot x) \cdot \log(x^3) + 4 \cdot \sin(x) \cdot \exp(4 \cdot x) \cdot \log(x^3) + 3 \cdot \sin(x) \cdot \exp(4 \cdot x) / x$

2)

a)

```
%Bisection method
function [c]=bisection(a,b,tol)
c=(a+b)/2;
while abs(f(c))>tol
    if f(c)<0
        a=c;
    else
        b=c;
    end
    c=(a+b)/2;
end
disp('the value of root')
disp(c)
```

```
function d=f(x)
d=2*x^3-x^2+5;
```

```
>>c=bisection(-2,-1,0.00001)
```

the value of root

-1.2094

c =

-1.2094

b)

>>d=solve('2*x^3-x^2+5=0')

d =

$$-1/6*(269+6*2010^{(1/2)})^{(1/3)}-1/6/(269+6*2010^{(1/2)})^{(1/3)}+1/6$$

$$1/12*(269+6*2010^{(1/2)})^{(1/3)}+1/12/(269+6*2010^{(1/2)})^{(1/3)}+1/6+1/2*i*3^{(1/2)}*(-1/6*(269+6*2010^{(1/2)})^{(1/3)}+1/6/(269+6*2010^{(1/2)})^{(1/3)})$$

$$1/12*(269+6*2010^{(1/2)})^{(1/3)}+1/12/(269+6*2010^{(1/2)})^{(1/3)}+1/6-1/2*i*3^{(1/2)}*(-1/6*(269+6*2010^{(1/2)})^{(1/3)}+1/6/(269+6*2010^{(1/2)})^{(1/3)})$$

>>exact=vpa(d)

exact=

-1.2093551367855328083602228561177

.85467756839276640418011142805884-1.1561763141271098012509119914988*i

.85467756839276640418011142805884+1.1561763141271098012509119914988*i

c)

```
>>e=abs(c-exact(1))
```

e =

```
.7361507671833602228561177e-6
```

3)

a)

```
%Euler method
function y=Euler(x0,y0,xn,h)
x(1)=x0;
y(1)=y0;
n=(xn-x0)/h;
for i=1:n
    y(i+1)=y(i)+h*f(x(i),y(i));
    x(i+1)=x(i)+h;
end
function d=f(x,y)
d=x+y;
```

```
>>y=Euler(0,1,0.2,0.1)
```

y =

```
1.0000 1.1000 1.2200
```

```
>>y(3)
```

```
ans =
```

```
1.2200
```

b)

```
>>dsolve('Dy = x+y', 'y(0) = 1','x')
```

```
ans =
```

```
-1-x+2*exp(x)
```

```
>>exact=-1-0.2+2*exp(0.2)
```

```
exact =
```

```
1.2428
```

c)

```
>>e=abs(exact-y(3))
```

```
e =
```

```
0.0228
```