MTH643
Mid Term Papers

Paper 1

Question #1

i. **Define x and initialize it with a value 15**
ii. **Take the square root of x and store the answer in variable y**
iii. **Write a code for expression** $w=x^{y}\times\sin(\pi)$

Solution:

```
>>  clc
>>  clear all
>>  close all
>>  syms x
>>  x=15
>>  y=sqrt(x)
>>  w=x^y*sin(pi)
```

Question #2

Write the following in matlab $Z=\frac{(x+y)^6}{x^2y}$ **then solve the expression to find the value of Z by substituting the value of x=6, y=7**

Solution:

```
>>  clc
>>  clear all
>>  close all
>>  syms x y
>>  z=(x+y)^6/(x^2*y);
>>  subs(z,{x,y},{6,7})
```

Question #3

Plot the contour $F(x,y)=\sin(x)+\cos(y)$ **over the interval of** $-5\le x\le 5$ and $-5\le x\le 5$

Solution:

```
>>  clc
>>  clear all
>>  close all
>>  syms x y z
>>  [x,y]=meshgrid(-5:0.1:5,-5:0.1:5)
>>  contour(x,y,sin(x)+cos(y))
```

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Question #4

Base and height given find the Area?

Solution:

As we know formula of Area of rectangle is $A=\frac{1}{2}(b\times h)$

```
>>  clc
>>  clear all
>>  close all
>>  b=4
>>  h=7
>>  A=1/2*b*h;
>>  disp(A)
```

Paper 2

Question #1

Find the value of the following expression

i. $U(x,y)=2x+x*y^2+3y$ at x=5

ii. f(x) = sin*x at x=pi/2

Solution:

I.

```
>>  clc
>>  clear all
>>  close all
>>  syms x y
>>  u=2*x+x*y^2+3*y;
>>  subs(u,x,5)
```

II.

```
>>  clc
>>  clear all
>>  close all
>>  syms x
>>  f=sin(x);
>>  subs(f,x,sym('pi/2'))
```

Question #2

Find the solution of the following system of linear equations in matlab (value of x, y and z should be displayed) $x+y+z=2 \quad -x+y-z=3 \quad x+2y+3z=-10$

Solution:

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```
clc
clear all
close all
syms x y z
[x,y,z]=solve('x+y+z==2','-x+y-z==3','x+2*y+3*z==-10')
```

Question #3

Plot the curve of the following in one graph $f(x)=2x^4+3x^3+5x^2+2x-3$

$g(x)=5x^4+2x^2+2x^2-2$ on domain [-10,10]

Solution:

```
>>  clc
>>  clear all
>>  close all
>>  syms x
>>  f=2*x^4+3*x^3+5*x^2+2*x-3
>>  g=5*x^4+2*x^2+2*x-2
>>  ezplot('f',[-10,10])
>>  hold on
>>  ezplot('g',[-10,10])
>>  hold off
```

Question #4

Take input from user

I. **What is your name?**
II. **What is your age?**

Then display your name and your age is

Solution:

```
>>  clc
>>  clear all
>>  close all
>>  name=input('enter the name: ','s')
>>  age=input('enter the age: ')
>>  if age>20
>>    disp('my age is 25')
>>  else age<20
>>      disp('my age is not 25')
>>  end
```

Paper 3

Question # 1

Plot the curve of the following function x^2-y^2-2xy over the domain $[-2\pi,2\pi]$

Solution:

```
>>   clc
```

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```
>>   clear all
>>   close all
>>   syms x y
>>   ezplot(x^2-y^2-2*x*y,[-2*pi,2*pi])
```

Question # 2

Plot the contour of $z = x^2 + y^2$ over the domain [-3,3]

Solution:

```
>>   clc
>>   clear all
>>   close all
>>   syms x y z
>>   [x,y]=meshgrid(-3:0.1:3,-3:0.1:3);
>>   z=x.^2+y.^2
>>   contour(x,y,z)
```

Question # 3

i. **Expand the expression** $x(x+y)^3(x-y)^2$

Solution:

```
i.   >> clc
     >> clear all
     >>  close all
     >>  syms x y
     >>  expand (x*(x+y)^3*(x-y)^2)
```

Question #4

Create the following matrix in MATLAB

$$A = \begin{bmatrix} x & 3 & 1 \\ 2 & 2 & 7 \\ 4 & 3 & y \end{bmatrix}$$

Then substitute the value of x as 3 and y as 7

Solution:

```
>>   clc
>>   clear all
>>   close all
>>   syms a x y
>>   A=[x 3 1;2 2 7;4 3 y];
>>   subs(A,{x,y},{3,7})
```

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