1. The number of particles of contamination that occur on an optical disc has a Poisson distribution, and the average number of particles is 10. Find the probability that 12 or less particles occur in the area of a disc. find the probability that 15 more particles occur in the area of a disc.
Solution:

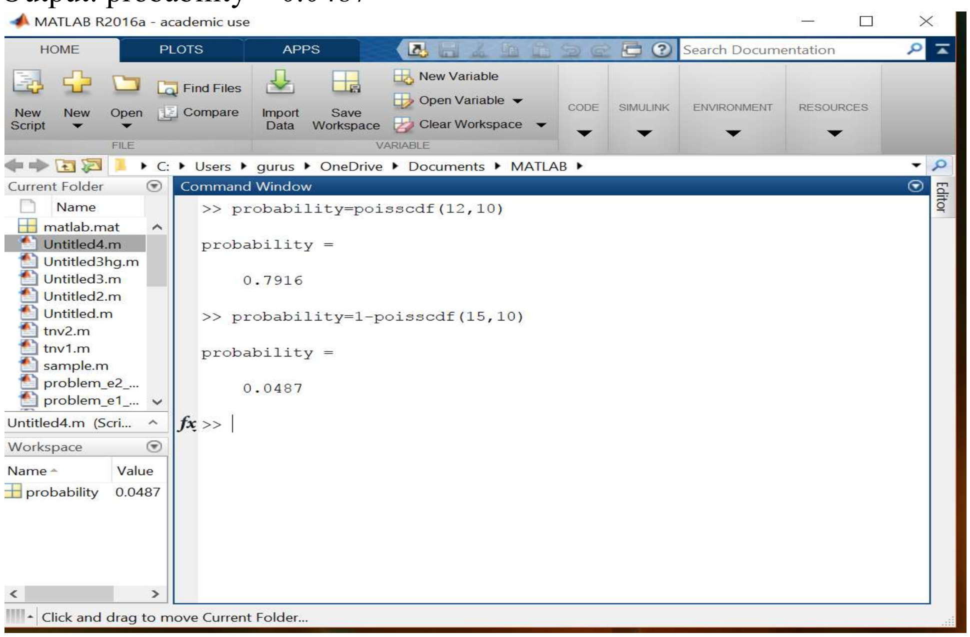
MATLAB CODE

Probability = poisscdf(x,lamda)% (This code will calculate the probability for ≤ x)

Probability = poisscdf(12,10)   % For the given problem, mean(λ)=10.

Output: probability = 0.7916

probability=1-poisscdf(x,lamda) % To find the probability greater than x: code is
For the given problem we want to Code: probability=1-poisscdf(15,10)
Output: probability = 0.0487



NORMAL DISTRIBUTIONS

2. The marks of 1000 students in an examination follows a normal distribution with mean 70 and standard deviation 5. Find

(i) no. of students whose score lies between 65 and 75 marks.

(ii) no. of students whose score more than 85.

Solution:

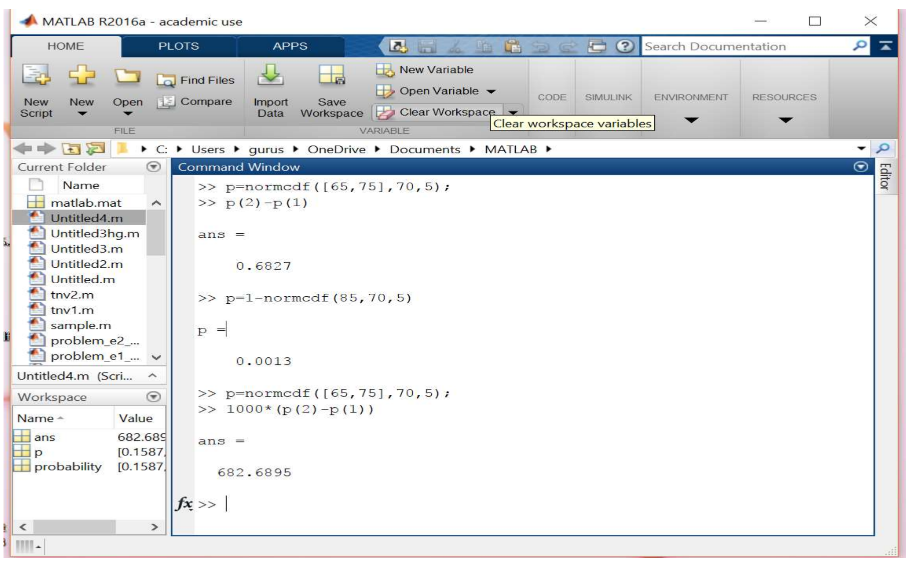
Matlab code:

probability=normcdf(x, mu,sigma) (This code will calculate the probability for ≤ x)
p=normcdf([65,75],70,5); % For the given problem, mean (mu)=70 and SD(sigma)=5.
>> p(2)-p(1) (p(2) is the probability for x=75 and p(1) is the probability for x=65.
The difference will give the probability in the given interval [65,75]).
ans =0.6827

To find the probability greater than x: code is [probability=1-normcdf(x,mu,sigma)]
For the given problem we want to find the probability for more than 85.
Code: probability=1-normcdf(85,70,5)
Output: probability = 0.0013

To find the number of students whose score lies between 65 and 75.
p=normcdf([65,75],70,5);
>> 1000*(p(2)-p(1))
ans = 682.6895

Similarly, To find the number of students whose score more than 85.
p=normcdf([85,70,5);
>> 1000* 0.0013
Ans=1.3 which is approximately equal to 1.



EXPONENTIAL DISTRIBUTION

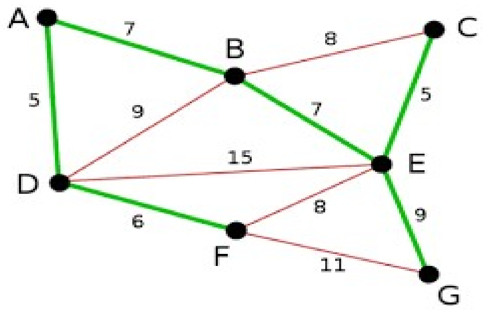
In a certain town, the duration of shower is exponentially distributed with mean 5 minutes. What is the probability that the shower will last for (i) less than 10 minutes (ii) 10 minutes or more and (iii) between 10 and 12 minutes.

MATLAB SYNTAX: As calculated for poisson and Normal, find for exponential using syntax:

expcdf(x,mu)

GRAPH THEORY

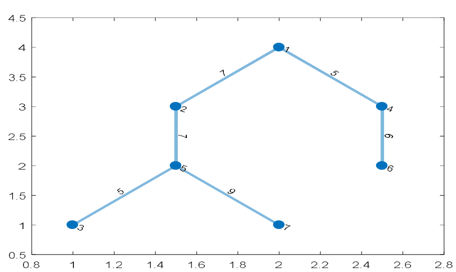
1. **Find the minimum spanning tree of the given graph using Prim's algorithm.**



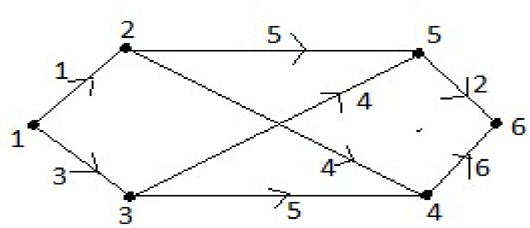
MATLAB CODE:

```
S=[1 1 2 2 2 3 4 4 5 5 6 ];
T=[2 4 3 4 5 5 5 6 6 7 7 ];
W=[7 5 8 9 7 5 15 6 8 9 11];
G=graph(S,T,W);
[MST,Pred]=minspantree(G,'Method','dense');
P=plot(MST,'EdgeLabel',MST.Edges.Weight);
highlight(P,MST)
sum(MST.Edges.Weight)
```

OUTPUT:



2. **Find the shortest distance between vertices 1 and 6 using Dijistra's algorithm for the given digraph.** **6M**



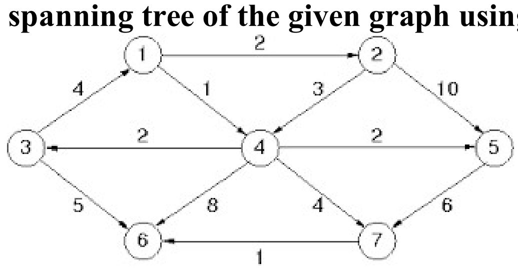
MATLAB CODE

```
S=[1 1 2 2 5 3 3 4];
T=[2 3 5 4 6 5 4 6];
W=[1 3 5 4 2 4 5 6];
G=digraph(S,T,W);
[path,d]=shortestpath(G,1,6);
P=plot(G,'EdgeLabel',G.Edges.Weight);
fprintf('%d\n',path);
fprintf('Length of the shortest path is:%d\n',d);
```

OUTPUT:

1
2
5
6
Length of the shortest path is: 8

3. Find the minimum spanning tree of the given graph using Kruskal's algorithm.



MATLAB CODE:

```
S=[1 1 2 2 3 3 4 4 4 4 5 7];
T=[2 4 4 5 1 6 3 5 6 7 7 6];
W=[2 1 3 10 4 5 2 2 8 4 6 1];
G=graph(S,T,W);
[MST,Pred]=minspantree(G,'Method','sparse');
P=plot(MST,'EdgeLabel',MST.Edges.Weight);
highlight(P,MST)
sum(MST.Edges.Weight)
```

OUTPUT