**Class Activity # Chapter 5 @ Normal Distribution in SAS**

As per CDC (Center for Disease Control and Prevention), the time between when someone is exposed to the COVID-19 virus and when they have symptoms (**incubation period**) is 2-14 days. The recommendation for a 14-day quarantine was based on estimates of the upper bounds of the COVID-19 **incubation** period. Assume that the incubation period of COVID-19 from the time of exposure follows a normal distribution with median time of 5 days, and standard deviation of 3 days.

(a) Determine the probability that a person with an exposure to COVID-19 will have symptoms between 3 and 6 days.

(b) Determine the probability that a person with an exposure will have symptom before 5 days.

(c) What is the probability that those with exposure will have symptoms after 9 days?

(d) What is the probability that those with exposure will have symptoms before 9 days?

(e) What is the cutoff time for 95% of the people with an exposure to have symptoms?

(f) What is the time for 10% people to have symptoms?

(g) What is the time that the first quartile of those exposed will have symptoms?

(h) What is the time that the third quartile of those exposed will have symptoms?

**data** normdist;

/\* time to symptoms ~N(5,3)\*/

/\*(a) Determine the probability that a person with an exposure to COVID-19 will have symptoms between 3 and 6 days.\*/

a=cdf("normal",**6**,**5**,**3**)-cdf("normal",**3**,**5**,**3**);

/\*(b) Determine the probability that a person with an exposure will have symptom before 5 days.\*/

b=cdf("normal",**5**,**5**,**3**);

/\*(c) What is the probability that those with exposure will have symptoms after 9 days?\*/

c=**1**-cdf("normal",**9**,**5**,**3**);

/\*(d) What is the probability that those with exposure will have symptoms before 9 days?\*/

d=cdf("normal",**9**,**5**,**3**);

/\*(e) What is the cutoff time for 95% of the people with an exposure to have symptoms?\*/

e=quantile("normal",**0.95**,**5**,**3**);

/\*(f) What is the time for the top 10% people to have symptoms?\*/

f=quantile("normal",**0.90**,**5**,**3**);

/\*(g) What is the time that the first quartile of those exposed will have symptoms?\*/

g=quantile("normal",**0.25**,**5**,**3**);

/\*(h) What is the time that the third quartile of those exposed will have symptoms?\*/

h=quantile("normal",**0.75**,**5**,**3**);

**run**;

**proc** **print**;**run**;