Time: 70 min.

Name : _____   ID#: _____

Circle your problem solving section number below:

- **Instructor :** Ms. Michella Bou Eid

    Sec 1 : Th @ 2 :00   **Sec 2 : Th @ 3 :30**   **Sec 3 : Th @ 5 :00**

- **Instructor :** Mrs Maha Itani-Hatab

    Sec 4: M @ 10:00   **Sec 5 : M @ 12 :00**   **Sec 6: M @ 1 :00**

- **Instructor :** Ms. Joumana Tannous

    Sec 7: W @ 1 :00   **Sec 8 : W @ 3 :00**   **Sec 9 : W @ 3 :00**

- **Instructor :** Ms. Najwa Fuleihan

    Sec 10: T @ 8 :00   **Sec 11 : T @ 9 :30**   **Sec 12: T @ 11 :00**

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Total	/100

Answer each of the following questions. (**Justify your answer and show your work**).

1. A survey of 80 students resulted in the data shown in the given table, which shows the class of students and their hair color .

- Complete the table:

(20 %)

Class — Hair color	Sophomores (O)	Junior (J)	Senior (R)	
Black (K)	....	12	5	27
Brown (N)	7	10	1 8	....
Blonde (D)	3	....	8	18
	20	29	....	80

- If **one** student in the survey is randomly selected ,find the probability that the student selected :

a) Is sophomore with black hair.

b) Has black hair or is a junior with blonde hair.

c) Is not senior knowing that he has brown hair.

d) Neither junior nor with blonde hair.

- If a team of 10 students is selected at random, what is the probability that it consists of
a) exactly 4 seniors.

b) all with black hair.

2

2. A small town has one fire engine and one ambulance available for emergencies.

(5 %) The probability that the fire engine is available when needed is 0.98 and the probability that the ambulance is available when called is 0.92 .Assuming that they operate independently , find the probability that :

a) Only one is available.

b) At least one is available.

3.   If $P(A) = 0.5$, $P(B'/A) = 0.6$ and $P(A \cup B) = 0.9$, Find:

a) $P(B)$

(15 %)

b) $P(A' \cup B)$

c) $P(A'/B')$

Are the events A' and B mutually exclusive?

Are the events A' and B independent?

4. In a certain airport the probability that a regularly scheduled flight departs on time is 0.85.
If it departs on time the probability that it will not arrive on time is 0.1. The probability that
it will arrive on time knowing that it didn't depart on time is 0.2.

(20 %)

let D = the event that a regularly scheduled flight departs on time.
A = the event that a regularly scheduled flight arrives on time,

- Construct a tree diagram to represent the given.

- Find the probability that a regularly scheduled flight:

a) Doesn't depart on time.

b) Departs and arrives on time.

c) Doesn't arrive on time.

d) Doesn't depart on time knowing that it arrived on time?

e) Departs on time or doesn't arrive on time?

4

5.　In a large population, the probability that a person wears eyeglasses is 0.3.

(20 %)　　　If 15 persons are selected randomly what is the probability that:

a)　Exactly 4 wear eyeglasses?

b)　Exactly 8 **don't** wear eyeglasses?

c)　less than 14 wear eyeglasses?

d)　No more than 14 or greater than 13 wear eyeglasses?

If it is known that at most 14 wear eyeglasses, what is the probability that at least 12 wear eyeglasses?

What is the expected number of persons that don't wear eyeglasses?

6. A radar unit is used to measure speeds of cars on a motorway. The speeds are normally distributed with a mean of 90 km/hr and a standard deviation of 8 km/hr.
What is the probability that the speed of a car picked at random is:

(12%)

a) more than 100 km/hr?

b) at most 92 km/hr?

c) between 72.8 and 100 km/hr?

7. Find the value of z_0 if :

(8 %)

a) the area to the left of z_0 on the standard normal curve is 0.0516.

b) $P(0.35 < z < z_0) = 0.344$