First exam

1) x is a random variable that takes the values 0, 1, 2 , $E(x) = 1.2$

$p(x=1) =$

what is $p(x=0)$?

solution:-

x	0	1	2
p(X=x)	x	0.6	y

$E(X) = 0 * x + 0.6 + 2y$

$1.2 = 0.6 + 2y$

$0.6 = 2y$

$\boxed{y = 0.3}$

Note:- مجموع الإحتمالات يساوي واحد منه نستنتج أن:

$x + 0.6 + 0.3 = 1$

$\boxed{x = 0.1}$

$p(X=0) = 0.1$ ← وهو المطلوب

② given that event A, B are mutual exclusive events then what's $p(A \cup B)$

$P(B) = 0.7$ $P(A) = 0.3$

solution:-

$p(A \cup B) = p(A) + p(B)$

$= 1$

3) تقوم فكرة السؤال على إعطائك

$x \sim N(200, 20^2)$

$p(x > a) = 0.0808$

↑ يطلب قيمة a

④ if you know that $Q_1 = 120$ and $Q_3 = 180$ then what is the outlies?

solution:-

$IQR = Q_3 - Q_1$

$= 180 - 120 = 60$

→ from right

$Q_3 + 1.5 * IQR$

$= 270$

→ from left

$Q_1 - 1.5 * IQR$

$= 30$

outlier (أقل) 30 - - - - - - 270 (أكبر) outlier

are not outlie

⑤ تعطي قيم ويطلب منك

1, 2, 2, 4, 4, 4, 5, 6

mean: $\frac{\sum x}{n}$ ** تطبيق مباشر على القانون

mode: 4 المنوال الأكثر تكرارًا.

⑥ ← تعطي جدول ويطلب منك CV

mean	σ^2	Q_2	Q_1
—	—	—	—

solution :-

(لا تتسرع)

$$CV = \frac{s}{\bar{x}}$$

ملاحظة :- سؤال بسيط لكن فكرته تقوم على الإنتباه على σ^2 لأن قانون CV لا يحتوي على تربيع فلا بد من أخذ الجذر لها.

⑨ what is the median
3, 4, 5, 6, 7, 8, 9, 11

solution:-

$$\text{median} = \frac{6+7}{2} = 6.5$$

⑩ Random variable X belongs to binomial distribution, $E(x) = 10$, $var(x) = 5$ find n and p :-

solution:-

$$var(x) = E(x) q$$

$$5 = 10(1-p)$$

$$\frac{1}{2} = 1 - p \Rightarrow \boxed{p = \frac{1}{2}}$$

$$E(x) = np$$

$$10 = \frac{1}{2} n$$

$$\boxed{n = 20}$$

⑦ which of the following considered as a discrete random variable :-

A) Number of visitors to the clinic.
B) .... time -----
C) ..temperature ---
D) time -----

the answer is: A

⑧

x	1	2	3
p(x=x)	0.3	0.6	0.1

Variance :- مطلوب ال

$$Var(x) = E(x^2) - (Ex)^2$$

$$= 3.6 - 3.24$$

$$= 0.36$$

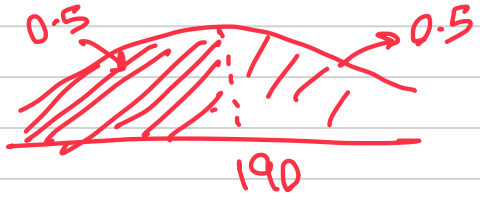
$$E(x) = 1*0.3 + 2*0.6 + 3*0.1$$

$$= 1.8$$

$$E(x^2) = 3.6$$

الأرقام ليست صحيحة هي فقط لفكرة سؤال الإمتحان.

Q.11) if you have a normal distribution with a mean 190 and a standard deviation 20
whate is the value below which half of observations fall?
the answer is: 190



Q.12) If the probability of 200000 women who tested negative for breast cancer 10 get cancer in the next 5 years, if 10 tested positive the probability is 1 getting breast cancer,what is the relative risk of having breast cancer and tested positive compared to having cancer and testimed negative

$$RR = \frac{P(A|B)}{P(A|\bar{B})}$$

Q.13) given that the data in front of you follows a normal distribution then find $P(x=60)$?

answer ⇒ Zero

Q.14

Hypertension Suppose 84% of hypertensives and 23% of normotensives are classified as hypertensive by an automated blood-pressure machine. What are the PV^+ and PV^- of the machine, assuming 20% of the adult population is hypertensive?

Solution: The sensitivity = .84 and specificity = 1 − .23 = .77. Thus, from Bayes' rule it follows that

$$PV^+ = (.84)(.2)/[(.84)(.2)+(.23)(.8)]$$
$$= .168/.352 = .48$$

Similarly, $PV^- = (.77)(.8)/[(.77)(.8)+(.16)(.2)]$
$$= .616/.648 = .95$$

This question is similar to the ones in the textbook!!