Philadelphia University
Faculty of Science
Department of Basic Sciences & Mathematics
Second Semester [2017 – 2018]

Probability and Statistics (250231)
Final Exam
Monday, 28 May 2018
Time: 120 minutes.

الاسم : ..... الرقم : ..... الشعبة : ..... المدرّس : .....

Question One: (*2.0 points each*). Write the correct answer for each of the following in the table provided. Only the answers in the table will be graded.

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16

1. For a sample of size $n=6$, if $\sum x=42$ and $\sum\left(x^2\right)=394$, then the sample variance s^2 equals
   A. 18 B. 8 C. 10 D. 20

2. For a bell – shaped data, if $\bar{x}=266$ and $s=9$, then the percentage of data in the interval $[257,275]$ is
   A. 95% B. 68% C. 97% D. 99%

3. The mean $\bar{x}$ of the following frequency distribution is
   A. 58.2 B. 57.6
   C. 57.0 D. 56.7

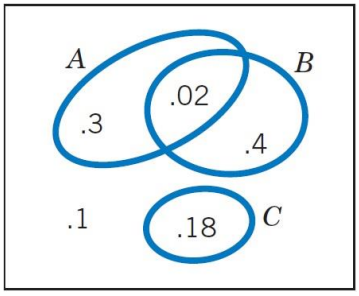
Class	50–52	53–55	56–58	59–61	62–64
Frequency	5	8	12	12	13

4. Suppose A and B are **independent** events such that $P(A)=0.3$ and $P(B)=0.4$, then $P(A\cup B)$ equals
   A. 0.52 B. 0.44 C. 0.58 D. 0.68

5. How many permutations of the letters of the word MATHEMATICAL are possible?
   A. 14968800 B. 19958400 C. 9979200 D. 4989600

6. For a discrete random variable X, if $\mathrm{Var}(3-2X)=16$ then $\mathrm{Var}(X)=$
   A. 4 B. 2 C. 3 D. 1

7. From the Venn–Diagram shown, the value of $P\left(\bar{A}\cap(B\cup C)\right)$ is
   A. 0.68
   B. 0.48
   C. 0.58
   D. 0.60



8. The 40th percentile p_{40} of the following data will equal

A. 85
B. 59
C. 75
D. 70

35	40	54	64	67
69	71	73	74	76
80	82	88	90	99

9. For a standard normal distribution Z, the value of $P(-1.24 < Z < 0.68)$ is

A. 0.7273 B. 0.6442 C. 0.5483 D. 0.6314

10. A discrete random variable X takes the values $X = 0,1,2$. If $P(X = 1) = 0.25$ and $E(X) = 1.05$, then $P(X = 2)$ equals

A. 0.35 B. 0.45 C. 0.55 D. 0.40

11. A continuous random variable X has probability density function $f(x) = \begin{cases} kx & : \quad 0 \le x \le 2 \\ 0 & : \quad \text{otherwise} \end{cases}$.

The value of k is

A. $\frac{1}{8}$ B. $\frac{2}{9}$ C. $\frac{1}{2}$ D. $\frac{2}{25}$

12. The correlation coefficient $r = 0.90$ means the linearly regression is

A. positively strong
B. negatively strong
C. positively weak
D. negatively weak

13. From a group of 3 women and 2 men, a committee consisting of 3 persons to be formed. How many different committees are possible if each committee contains at least 1 man and 1 woman?

A. 9 B. 6 C. 10 D. 3

14. If Z is a standard normal distribution such that $P(Z \ge c) = 0.0119$, then c equals

A. 1.73 B. –2.26 C. 2.26 D. –1.73

15. A continuous random variable X has probability density function $f(x) = \begin{cases} 3x^2 & : \quad 0 \le x \le 1 \\ 0 & : \quad \text{otherwise} \end{cases}$.

The value of $P\left(X \ge \frac{1}{2}\right)$ is

A. $\frac{1}{4}$ B. $\frac{1}{8}$ C. $\frac{3}{4}$ D. $\frac{7}{8}$

16. Let X be a binomial distribution with parameters n and p. If $E(X) = 3.6$ and $\sigma^2 = 1.44$, find the value of n and p.

A. $n = 4,\ p = 0.4$
B. $n = 6,\ p = 0.6$
C. $n = 4,\ p = 0.6$
D. $n = 6,\ p = 0.3$

Question Two: (*2+3 points*). The following is the probability distribution of a discrete random variable X .

$X = x$	0	1	2	3
$P(X = x)$	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{1}{8}$

Use this distribution to evaluate the following.

1) $P(1 < X \leq 3)$

2) σ^2

Question Three: (*4 points*). Given that $P(A)=\frac{21}{50}$, $P(B)=\frac{19}{50}$, and $P(A\cup B)=\frac{35}{50}$. Find $P(\bar{A}\,|\,B)$.

Question Four: (*3 points*). Let X be normally distributed with mean μ and standard deviation $\sigma=2.5$. Find the value of μ if $P(X<5.55)=0.0375$.