225

The University of Jordan
Mathematics Department

Principles of Statistics
First Exam March , 2016

Name: **Number:**

Section: **Instructor:**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
a	✓							✓		✓		✓					
b				✓						✓	✓				✓		
c			✓			✓	✓					✓		✓			
d		✓											✓			✓	
e					✓				✓								✓

Multiple Choice

Identify the choice that best completes the statement or answers the question.

$n_A(a) = \{(2,1)(2,2)(2,3)(\quad)\}$ $P(a) = \frac{n(a)}{n(\Omega)} = \frac{3}{36} = \frac{1}{12}$

1. Rolling a die twice, find the probability of getting 2 in the first trial and a sum less than 6 in both trials.
   a. 1/12 b. 5/18 c. 13/36 d. 1/18 e. 7/18

2. For a sample: the mean is 20, the first quartile is 14, the third quartile is 28, the standard deviation is 6. If we add 6 to each observation then we divide the result by -2.
   The new variance will be
   a. 36 b. 18 c. 144 d. 9 e. 72

$\bar{x} = 20$

$Q_1 = 14$

$Q_3 = 28$

$S = 6$

$y = \frac{x+6}{-2}$

$S_{new} = \frac{6}{|-2|} = 3$

$S^2_{new} = 9$

3. Given the following sample:

Class	Frequency	Actual upper	C.F
0-6	1	6.5	1
7-13	4	13.5	5 ←
14-20	3	20.5	8
21-27	2	27.5	10

$(0.50)(10) = 5$

The median is

a. 14.5 b. 15 c. 13.5 d. 14 e. 13

4. Given the following sample:

Class	Frequency
0-6	1
7-13	4
14-20	3
21-27	2

Class Centers: 3, 10, 17, 24

$\bar{x} = \frac{(3\times1)+(10\times4)+(17\times3)+(24\times2)}{10} = \frac{142}{10} = 14.2$

The mean of this sample is

a. 14.7 b. 14.2 c. 15.3 d. 14.9 e. 15.1

5. The grades of 15 students have mean 40. If the grade of a student is changed from 42 to 48, the new mean will be

a. 40.7 b. 40.6 c. 40.8 d. 40.2 e. 40.4

$n = 15$

$\bar{x} = 40$

$\bar{x} = \frac{\Sigma x_i}{n} \Rightarrow 15 \times 40 = \Sigma x_i = 600$

$\bar{x} = \frac{600 + 48 - 42}{15} = 40.4$

Omega academy

$\bar{x} = \frac{4+0+8+x+1}{5} \Rightarrow$ $3 = \frac{4+0+8+x+1}{5} \Rightarrow 15 = 13 + x \Rightarrow x = 2$

$15 - 13 = x = 2$

0 1 4 8 3 2

0 2 4 8

6. If the mean of the following observations: 4, 0, 8, x, 1, is 3, then the median is
   a. 3 c. 2 d. 5 e. 1

7. A class contains 8 students, 6 of them are Math and 2 of them are Physics. If we choose 2 students from this class without replacement, then the probability that the second student is Physics given that the first student is Physics equals
   a. 2/7 b. 1/6 c. 1/7 d. 2/8 e. 1/8

8. The weights of a sample of 300 students are bell-shaped with mean 60 kgs and standard deviation 4 kgs. The weight above which there are about 48 students is
   a. 64 b. 56 c. 70 d. 72 e. 68

6 Math | 2 Physics

$\frac{2}{8} \cdot \frac{1}{7}$

$n = 300$

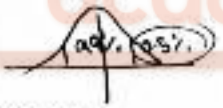
$\bar{x} = 60$

$s = 4$

$48 = 60 - k4$

$4k = 60 - 48$

$k = \frac{12}{4} = 3$



$\Rightarrow$ (0.005)(300)

$48 = (\text{Perc.\%})(300)$

$\text{Percent\%} = 0.16 = 16\% \rightarrow k = 1$

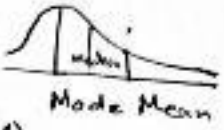
below: $x_i = \bar{x} - 4 = 60 - 4 = 56$

above $x_i = \bar{x} + 4 = 64$

$\left\lceil \frac{\text{Range}}{4} \right\rceil = \left\lceil \frac{25-8}{4} \right\rceil$

9. Consider the following sorted data:
8, 9, 9, 11, 12, 14, 14, 14, 15, 17, 18, 19, 19, 20, 21, 21, 23, 25
if we want to create a frequency table of 4 classes of equal length, then the class length is
a. 7 b. 4 c. 6 d. 3 e. 5

10. For a unimodal skewed to the left distribution, if the median = 40, then one of the following could be correct
a. mean = 42, mode = 38
b. mean = 38, mode = 43
c. mean = 46, mode = 43
d. mean = 38, mode = 36.
e. mean = 43, mode = 46



11. In a random experiment, given that $P(B) = 0.6$, $P\left(\overline{A} \cap \overline{B}\right) = 0.3$, $P\left(A \cap B\right) = 0.4$, find $P(A)$.
a. 0.3 b. 0.5 c. 0.4 d. 0.6 e. 0.7

$P(B) = 0.6$
$P(\overline{A} \cap \overline{B}) = 0.3$
$P(A \cap B) = 0.4$
$P(A) = ?$

$P(\overline{A} \cap \overline{B}) = P(\overline{A \cup B}) = 1 - P(A \cup B) = 1 - (P(A) + P(B) - P(A \cap B))$
$= 1 - P(A) - 0.6 + 0.4$
$0.3 = 0.4 - P(A) + 0.4$
$P(A) = 0.8 - 0.3 = 0.5$

B B G G G

$3(2!, 3!) = 3(2 \times 6)$

12. The number of ways 2 boys and 3 girls stand in a line such that the boys are next to each other is
a. 48 b. 18 c. 36 d. 12 e. 24

13. The third quartile of the following data: 4, 5, -3, 1, 5, 2, 6, 7, 11, 8, 9 is
a. 5 b. 7 c. 6 d. 8 e. 9

14. The grades of a sample of 400 students have mean 70 and variance 16. The number of students whose grades are between 62 and 78 is at least
a. 290 b. 320 c. 300 d. 280 e. 310

$Q_3 = 0.75(11) = 8.25$

$-3, 1, 2, 4, 5, 5, 6, 7, 8, 9, 11$

$n = 400$

$\bar{x} = 70$

$s^2 = 16 \Rightarrow s = 4$

$(62, 78)$

$62 = \bar{x} - ks$

$62 = 70 - 4k$

$4k = 8$

$k = 2$

$78 = \bar{x} + ks$

$78 = 70 + 4k$

$8 = 4k$

$k = 2$

at least $= 1 - \frac{1}{k^2} = \frac{3}{4}$

$\frac{3}{4} \times 400 = 300$

15. A box contains 10 balls, 8 are white and 2 are black. If we draw 4 balls together, the probability of getting 3 white balls is

a. $\frac{\binom{4}{1}}{\binom{8}{3}}$ b. $\frac{\binom{8}{3}\binom{2}{1}}{\binom{10}{4}}$ c. $\frac{\binom{4}{3}}{\binom{10}{4}}$ d. $\frac{\binom{8}{3}}{\binom{10}{4}}$ e. $\frac{\binom{4}{3}\binom{2}{1}}{\binom{10}{4}}$

16. A sample of 10 observations has mean 30 and standard deviation 5. The sum of the squares of the observations $\left(\sum_{i=1}^{10} x_i^2\right)$ is

a. 9350 b. 9320 c. 9000 d. 9225 e. 9100

17. For a sample: the mean is 20, the first quartile is 14, the third quartile is 28, the standard deviation is 6. If we add 6 to each observation then we divide the result by -2. The new first quartile will be

a. -10 b. 17 c. 10 d. 16 e. -17

$n = 10$

$\bar{X} = 30$

$S = 5$

$\sum_{i=1}^{10} X_i^2 = ?$

$S^2 = \frac{\sum X_i^2 - n\bar{X}^2}{n-1}$

$25 = \frac{\sum x_i^2 - 10(900)}{9} \Rightarrow 225 = \sum x_i^2 - 9000$

$\bar{X} = 20$

$Q_1 = 14$

$Q_3 = 28$

$S = 6$

$Y = \frac{X+6}{-2}$

$Q_1 = \frac{28+6}{-2} = -17$