

Philadelphia University
Department of Basic Sciences and Mathematics

First Exam

Probability Theory

17-11-2015

Name: _____ Number: _____ Serial: _____ Section: (1)

Question ONE : (16 points) Write the symbol of the correct answer in the space beside the question number.

1. [] Two fair dice, one of which is an ordinary die, and the other has sides with 1, 3, 5, 7, 9, 10, are rolled at random. Find the probability of rolling a sum of 12.
(A) $\frac{1}{12}$ (B) $\frac{1}{18}$ (C) $\frac{1}{6}$ (D) $\frac{1}{36}$
2. [] Anas hits a target with probability 0.8 and Fadi hits the same target with probability 0.75. If they aim at the target, what is the probability that neither will hit it?
(A) 0.05 (B) 0.20 (C) 0.15 (D) 0.60
3. [] Let $\mathbf{A} = \{100, 101, \dots, 999\}$ be the set of three-digit positive integers. How many integers in \mathbf{A} has exactly two 7's?
(A) 8 (B) 26 (C) 29 (D) 90
4. [] How many arrangements are there of the word **ENERGUMEN** ?
(A) $\frac{9!}{3!2!}$ (B) $9!$ (C) $\frac{9!}{3!}$ (D) $\frac{9!}{2!}$
5. [] A community of 5 will be formed from among 9 men and 7 women. In how many of these communities are there an odd number of women?
(A) 2142 (B) 4368 (C) 63 (D) 2163
6. [] If $P(A') = \frac{1}{4}$, $P(B') = \frac{3}{16}$ and $P(A \cup B) = \frac{7}{8}$, find $P(A \cap B)$.
(A) $\frac{15}{16}$ (B) $\frac{1}{8}$ (C) $\frac{1}{4}$ (D) $\frac{11}{16}$

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7. $\left[\begin{array}{c} \\ \\ \end{array} \right]$ What is the coefficient of $x^{14}y^7$ in the expansion of $(x+y)^{21}$?
- (A) $\binom{21}{14}$ (B) $\binom{21}{7}$ (C) $\frac{21!}{14!7!}$ (D) All choices
8. $\left[\begin{array}{c} \\ \\ \end{array} \right]$ Consider the square "dartboard" in the figure, consisting of three concentric squares. The inner square being black has side 1, followed by a white square has side 2, which is followed by an outer red square of side length equals 4. If a person throwing darts never misses the dartboard, what is the probability that she will hit the outer red region?
- (A) $\frac{1}{16}$ (B) $\frac{3}{4}$ (C) $\frac{3}{16}$ (D) $\frac{1}{4}$

Question TWO : (4 points) There are two dice: an ordinary fair die, painted blue, and a die with faces 1, 1, 3, 3, 4, 5, painted red, on which each face has an equal chance of appearing. A die is chosen at random, rolled, and a 3 appears. What is the probability that it was the blue die?

[illegible]