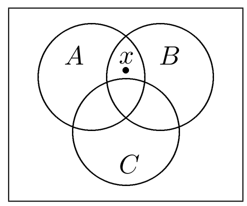
Exam 1 – Version 2

This is a 50 minute test.

1. Of a group of 100 people, 33 like earrings, 29 like tattoos, and 26 like tattoos but don't like earrings. How many like neither earrings nor tattoos?

   (A) 59 (B) 41 (C) 38 (D) 12 (E) none of the others

2. In the diagram below, which of the following is true?

   (A) $x \in (A \cap C') \cup (B \cap C)$ (B) $x \in (A \cup B) \cap (A' \cup C)$ (C) $x \in (A \cap C') \cap (B \cap C)$
   (D) $x \in (A \cap C) \cup (B' \cap C)$ (E) none of the others

3. Two 6-sided dice are rolled. What is the probability that at least one of the dice shows a 1?

   (A) $\frac{1}{3}$ (B) $\frac{1}{12}$ (C) $\frac{11}{36}$ (D) $\frac{1}{6}$ (E) none of the others

4. A saleswoman is scheduling trips to visit 3 of the following 6 cities: Cleveland, Chicago, St. Louis, Buffalo, Detroit, and Kansas City. A schedule is a list of the 3 cities in the order to be visited. How many different schedules are there which include Kansas City?

   (A) 60 (B) 120 (C) 20 (D) 24 (E) none of the others

5. Find $n(A \cap B)$, given that A and B are subsets of U with $n(U) = 52$, $n(A' \cap B') = 8$, $n(A) = 31$, and $n(B') = 10$.

   (A) 29 (B) 44 (C) 21 (D) 33 (E) none of the others

6. A Greek urn contains a red ball, a blue ball, a yellow ball, and an orange ball. A ball is drawn from the urn at random and then replaced. If one does this 4 times, what is the probability that all 4 colors were selected?

   (A) $\frac{1}{70}$ (B) $\frac{3}{32}$ (C) $\frac{2}{9}$ (D) $\frac{1}{4}$ (E) none of the others

7. A fortune teller foretells that each of 4 boys (Eric, Jason, Jeff, Kevin) will marry one of 4 girls (Jodie, Lisa, Susan, Wendy). How many ways can this be done? (No divorces or bigamy please!)

   (A) 12 (B) 6 (C) 44 (D) 24 (E) none of the others

8. How many 4-letter words can be formed by rearranging the letters in the word "seek"?

   (A) 12 (B) 2^4 (C) 6 (D) 24 (E) none of the others

9. Godzilla wants to destroy two buildings: a fast-food restaurant and either a tanning salon or a public restroom. He sees the following buildings: 2 fast-food restaurants, 3 tanning salons, and 2 public restrooms. How many ways can Godzilla fulfill his desires?

   (A) 10 (B) 21 (C) 12 (D) 7 (E) none of the others

10. I have 4 pencils, 3 ball-point pens, and a felt-tip marker in a cup on my desk. I choose a writing implement from the cup randomly. What is the probability that it is **not** a ball-point pen?

    (A) $\frac{1}{3}$ (B) $\frac{2}{3}$ (C) $\frac{5}{12}$ (D) $\frac{3}{8}$ (E) none of the others

11. Captain Jean-Luc Picard has 3 blue shirts and 5 red shirts. He picked two at random to take on a weekend trip to Earth. What is the probability that he took a shirt of each color?

    (A) $\frac{1}{15}$ (B) $\frac{2}{7}$ (C) $\frac{8}{15}$ (D) $\frac{15}{28}$ (E) none of the others

12. Constance Noring has 5 cassettes by the Rolling Stones and 2 cassettes by R.E.M. She picks three at random to listen to in her car. What is the probability that she takes 2 by the Rolling Stones and 1 by R.E.M.?

    (A) $\frac{2}{35}$ (B) $\frac{2}{7}$ (C) $\frac{13}{35}$ (D) $\frac{4}{7}$ (E) none of the others

13. Bob Smith watches the television talk shows on Wednesday morning. After each show he notes whether it is dull, offensive, or good. He turns off the TV after seeing 1 dull show, 1 offensive show, or if 3 shows have been watched altogether. How many outcomes are possible?

    (A) 13 (B) 23 (C) 7 (D) 9 (E) none of the others

Numbers 14–16 are True/False.

14. $n(A \cap B) + n(A \cup B) = n(A) + n(B)$ for any sets A and B.

15. $(A \cup B)' = A' \cup B'$ for any sets A and B.

16. Flip two coins and note the number of heads. The outcomes $\{0, 1, 2\}$ are equally likely.