King Fahd University of Petroleum and Minerals
Department of Mathematics
STAT 201
Exam 1
Term 252
February 15, 2026
Net Time Allowed: 90 Minutes

MASTER VERSION

1. (Exercise 2 - 82) A computer system uses passwords that are six characters, and each character is one of the 26 letters $(a - z)$ or 10 integers $(0 - 9)$. Uppercase letters are not used. Let A denote the event that a password begins with a vowel (either a, e, i, o, u), and let B denote the event that a password ends with a prime number (either 2, 3, 5, or 7). Suppose a hacker selects a password at random. Determine $P(A' \cup B')$.

   (a) 0.9846 _____ (correct)

   (b) 0.7500

   (c) 0.7654

   (d) 0.8611

   (e) 0.8889

2. (Exercise 2 - 95) A lot of 11 semiconductor chips contains 4 that are defective. Two are selected randomly, ***with replacement*** (that is, the first chip is returned to the lot before the second selection), from the lot. What is the probability that the second one selected is defective given that the first one was defective?

   (a) 0.3636 _____ (correct)

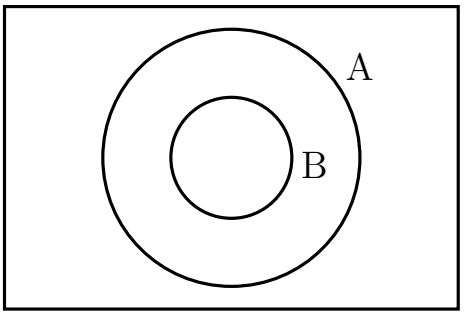
   (b) 0.3000

   (c) 0.1322

   (d) 0.5950

   (e) 0.6364

3. (Exercise 2 - 99) In the following Venn diagram, event A is represented by the larger circle, and event B is represented by the smaller circle contained entirely within A.



Assuming $P(B) > 0$, what is $P(A \mid B)$?

(a) 1.00 _____(correct)

(b) 0.00

(c) 0.50

(d) 0.25

(e) 0.75

4. (Exercise 2 - 107) The probability is 3% that an electrical connector that is kept dry fails during the warranty period of a portable computer. If the connector is ever wet, the probability of a failure during the warranty period is 7%. If 85% of the connectors are kept dry and 15% are wet, what proportion of connectors fail during the warranty period?

(a) 0.036 _____(correct)

(b) 0.964

(c) 0.026

(d) 0.011

(e) 0.024

5. (Exercise 2 - 124) If $P(A) = 0.3, P(B) = 0.3$, and A and B are mutually exclusive. Which statement is true for the two events A and B ?

   (a) The two events are not independent _____(correct)

   (b) The two events are independent

   (c) The two events are collectively exhaustive

   (d) The two events are complementary to each other

   (e) The two events are independent and collectively exhaustive

6. (Exercise 3 - 17)
   $f(x) = \dfrac{2x+1}{25}, \quad x = 0, 1, 2, 3, 4$. Determine $P(X < -10)$

   (a) 0.00 _____(correct)

   (b) 1.00

   (c) 0.80

   (d) 0.20

   (e) 0.75

7. (Exercise 3 - 43)

$$F(x) = \begin{cases} 0, & x < -10 \\ 0.1, & -10 \leq x < 30 \\ 0.6, & 30 \leq x < 50 \\ 1, & 50 \leq x \end{cases}$$

Determine $P(40 < X < 60)$

(a) 0.4 (correct)

(b) 1.0

(c) 0.1

(d) 0.0

(e) 0.5

8. (Exercise 3 - 49) If the range of X is the set $\{0, 1, 2, 3, 4, 5\}$ and

- $P(X = x) = 0.2$ for each $x \in \{2, 3, 4, 5\}$,
- $P(X = 0) = P(X = 1)$.

Determine the mean of the random variable X.

(a) 2.9 (correct)

(b) 2.5

(c) 3.5

(d) 3.0

(e) 5.0

9. (Exercise 3 - 86) An electronic product contains 45 integrated circuits. The probability that any integrated circuit is defective is 0.015, and the integrated circuits are independent. The product operates only if there are no defective integrated circuits. What is the probability that the product operates?

   (a) 0.5066 _____(correct)

   (b) 0.4934

   (c) 0.8537

   (d) 0.3250

   (e) 0.9347

10. (Suggested Problem 3 - 123) A company employs 50 men under the age of 55. Suppose that 4% (i.e. 2 out of 50 men) carry a marker on the male chromosome that indicates an increased risk for high blood pressure. If 15 men in the company are tested for the marker in this chromosome, what is the probability that more than one has the marker?

    (a) 0.0857 _____(correct)

    (b) 0.4286

    (c) 0.4857

    (d) 0.5143

    (e) 0.9143

11. (Suggested Problem 3 - 135) Astronomers treat the number of stars in a given volume of space as a Poisson random variable. The density in the Milky Way Galaxy in the vicinity of our solar system is one star per 16 cubic light-years. What is the probability of three or more stars in 16 cubic light-years?

    (a) 0.0803 _____(correct)

    (b) 0.9197

    (c) 0.0613

    (d) 0.2642

    (e) 0.0500

12. (Exercise 6 - 24) A stem-and-leaf plot for the percentage of cotton in material used to manufacture men's shirts is given below (`stem unit = 1.0, leaf unit = 0.1`):

```
31 | 1
32 | 5 5 6 9
33 | 1 1 4 4 5 6 6 6 6 6 8 8
34 | 0 1 1 1 2 3 3 4 5 5 6 6 6 6 7 7 7 7 7 7 9
35 | 0 0 1 1 1 2 3 4 5 5 6 7 8
36 | 1 2 3 4 8 8 8 8
37 | 1 3 5 6
38 | 5
```

    There are $n = 64$ observations in this data set. How many of them are outliers? Use the $1.5 \times$ IQR rule.

    (a) 2 _____(correct)

    (b) 0

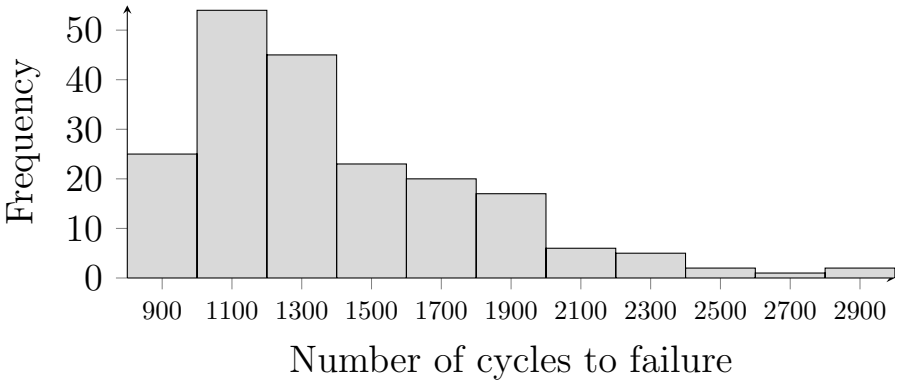
    (c) 3

    (d) 5

    (e) 6

13. (Suggested Problem 6 - 43) Following histogram is constructed for the numbers of cycles to failure of aluminum test coupons subjected to repeated alternating stress at 144,790 kN/m^2, 18 cycles per second.

If the sample mean of this data is 1395, which of the following values could be the sample median?



(a) 1276 _____(correct)

(b) 2395

(c) 1725

(d) 1491

(e) 1937

14. (Suggested Problem 6 - 1)Which one of the following is ***not necessarily true*** about the sample mean $\bar{x}$?

(a) It always corresponds to one of the observations in the data. _____(correct)

(b) It always lies between the smallest and the largest observation in the sample.

(c) If every observation is multiplied by 5, then the sample mean is multiplied by 5.

(d) It can be larger than the sample standard deviation s.

(e) If 5 is added to every observation, then the sample mean increases by 5.