

Formulae

- $S_{XX} = \sum (x - \bar{x})^2$
- $S_{XY} = \sum (x - \bar{x})(y - \bar{y})$
- $S_{YY} = \sum (y - \bar{y})^2$
- $r = \frac{S_{XY}}{\sqrt{S_{XX}S_{YY}}}$
- $y = \frac{S_{XY}}{S_{XX}}x + \left(\bar{Y} - \frac{S_{XY}}{S_{XX}}\bar{X}\right)$

Quizzes 1-4

1. Let $U = \{a, e, i, o, u\}$, $A = \{a, e, i\}$, and $B = \{e, o\}$. Find
 - (a) $n(A)$
 - (b) A^C
 - (c) B^C
 - (d) $A^C \cup B$
 - (e) $A \cap B^C$
 - (f) all subsets of A .
2. Regard the set of books you own as a population. For each of the following variables X ,
 - (a) X is the year of publication
 - (b) X is the number of pages
 - (c) X is the number of books you own
 - (d) X is the author,
answer the following questions.
 - i. Does X make sense as a variable for this population?
 - ii. If yes, is X quantitative?
 - iii. If yes, is X discrete or continuous?
3. For the following data
3 6 2 3 3 2 3 8,
find
 - (a) a histogram
 - (b) the frequency polygon
 - (c) the mean
 - (d) the median
 - (e) the mode.
4. Find the five-number summary for the following data.
10 12 15 10 11 10 12 9 10 11 12.

Answers

1. (a) 3
(b) $\{o, u\}$
(c) $\{a, i, u\}$
(d) $\{e, o, u\}$

- (e) $\{a, i\}$
 (f) $\emptyset, \{a\}, \{e\}, \{i\}, \{a, e\}, \{a, i\}, \{e, i\}, \{a, e, i\}$.
2. (a) i. Yes
 ii. Yes
 iii. Discrete
 (b) i. Yes
 ii. Yes
 iii. Discrete
 (c) i. No
 (d) i. Yes
 ii. No
3. (a)
 (b)
 (c) 4
 (d) 3
 (e) 3
4. 9, 10, 11, 12, 15

Quizzes 5–9

5. For the standard normal variable $Z \in N(0, 1)$, find
- (a) the area to the left of $z = 2.73$,
 (b) the area to the right of $z = 1.28$,
 (c) the area between $z = .91$ and $z = 2.52$, and
 (d) the value of z such that the area to the left of z is .9419.

Answer:

- (a) .9968
 (b) .1003
 (c) .1755
 (d) $z = 1.57$
6. The grades for a certain exam are distributed normally with mean $\mu = 78$ and standard deviation $\sigma = 5$.
- (a) Sketch the normal curve for this variable and label the mean.
 (b) Find the area to the left of 89. Shade this area on your sketch.
 (c) Find the 60th percentile P_{60} .
 (d) What percentage of students has a grade above 90?

Answer:

- (a)
 (b) .9861
 (c) $P_{60} = 79.25$
 (d) .0082
7. The population is a set of pencils. Let X be the length in centimeters (cm) and let Y be the mass in grams (g). We have the following data

X	10	12	15	19
Y	21	25	24	30

- (a) Draw a scatter diagram.
- (b) Find r .
- (c) Find the equation for the regression line.
- (d) What the the weight expected for a 13-centimeter long pencil.

Answer: We compute $S_{XX} = 46$, $S_{XY} = 40$ and $S_{YY} = 42$. Then we have the following.

- (a)
- (b) $r = .91$
- (c) $y = .87x + 12.83$
- (d) 24.14 g.

Quizzes 9–16

9. \mathcal{E} = choosing a ball from a box that contains exactly 3 white balls, 2 blue balls, and 1 red ball.

- (a) Write the sample space
- (b) Find $P\{\text{Blue}\}$
- (c) Find $P\{\text{Black}\}$
- (d) Find the compliment of the event $\{\text{Red}\}$

Answer:

- (a) $\{W1, W2, W3, B1, B2, R\}$
- (b) $\frac{1}{3}$
- (c) 0
- (d) $\{W1, W2, W3, B1, B2\}$

10. \mathcal{E} = choosing balls from a box containing 5 red balls and 4 yellow balls. Find the probability of

- (a) 2 yellow balls
- (b) a red ball the first time and a yellow the second time
- (c) 2 balls of the same color
- (d) a red ball the second time knowing that a red ball was chosen the first time

Answer: $\frac{1}{6}, \frac{5}{18}, \frac{4}{9}, \frac{4}{8}$

11. An ATM PIN is required to have 4 different digits. How many ATM PIN's are possible?

Answer: 5040

12. Determine how much money you must invest at 7% **simple interest** in order to have a future value of \$2000 after 3 years.

Answer: \$1652.89

13. What is the monthly payment on a 30-year mortgage of \$70,000 at 9.9%?

Answer: \$609.13

14. Two coins are tossed. Write the sample space. Find the probability of obtaining two heads.

Answer: $\{HH, HT, TH, TT\}, \frac{1}{4}$

15. $A = \{u, v, w\}, B = \{x, y\}, C = \{u, y\}, \mathcal{U} = \{x, y, z, u, v, w\}$. Find $(A \cap B^C) \cup C$.

Answer: $\{u, v, w, y\}$

16. Find C_8^{10} and A_8^{10} .

Answer: 45 and 1,814,400

Exam 1 Answers

1. $A = \{10\}$, $B = \{x|x \text{ is an odd number between 2 and 8}\}$.
2. (a) $n(A) = 2$
(b) $2^2 = 4$
(c) Yes
(d) Yes
3. (a) $A \cap B = \{1, 5\}$
(b) $A \cup B = \{1, 2, 3, 5, 6\}$
(c) $A^C = \{3, 4\}$
(d) $A \cap B^C = \{2, 6\}$
4. $n(A \cup B) = 90$, $n(A \cap B) = 45$.
5. (a) Quantitative, continuous
(b) Qualitative
(c) Quantitative, discrete
(d) Quantitative, continuous
- 6.
7. (a) 4
(b) 4
(c) 1
(d) 2.56
(e) 8
(f) 1,1,4,6,9

Exam 2 Answers

1. .0776
2. 106.4
3. (a)
(b) 97.72%
(c) 26.4 minutes
4. (a)
(b) $r = -.85$
(c) $y = -.43x + 26.64$
(d) 4 students

Exam 3 Answers

1. (a) $A = \{1, 2, 3\}$
(b) $B = \{1, 3, 5\}$
(c) $A \cap B = \{1, 3\}$
(d) $A \cup B = \{1, 2, 3, 5\}$
(e) $A^C = \{4, 5, 6\}$
2. 15, 336, 120

3. (a) $\frac{6}{13}$
(b) $\frac{3}{13}$
(c) $\frac{7}{13}$
(d) $\frac{8}{12}$
4. 7920
5. \$2068.97
6. 6.07%
7. (a) \$25,000
(b) \$225,000
(c) \$1496.93