

Unit 3: Two-Variable Statistics

ADVANCED

Name: _____ Date: _____

Show all work and give each answer as a single exact value (fraction in lowest terms, decimal, or number).

1. In a survey of 250 people, 140 own a dog. Of the dog owners, 98 also own a cat. Of the 110 non-dog-owners, 44 own a cat. Given that a randomly selected person owns a cat, find the probability that they own a dog. Give a fraction in lowest terms.

Answer: _____

3. For the same data set (1, 4), (2, 5), (3, 9), (4, 10), (5, 12), the least-squares slope is 2.1. Find the y-intercept of the line of best fit using $b = \bar{y} - m \cdot \bar{x}$.

Answer: _____

5. A line of best fit is $y = 3.5x - 2$. For the actual data point (6, 21), compute the residual (actual y minus predicted y).

Answer: _____

7. A two-way table of 400 people classifies drink preference by time of day: morning-tea = 60, morning-coffee = 140, evening-tea = 110, evening-coffee = 90. What percent of all people prefer tea? Give a percent.

Answer: _____

9. A line of best fit is $y = -1.5x + 40$. For what value of x does the line predict $y = 10$?

Answer: _____

2. Find the slope of the least-squares line of best fit for the data set (1, 4), (2, 5), (3, 9), (4, 10), (5, 12). Use $\text{slope} = (n \cdot \Sigma xy - \Sigma x \cdot \Sigma y) / (n \cdot \Sigma x^2 - (\Sigma x)^2)$.

Answer: _____

4. A line of best fit is $y = 2.1x + 1.7$. Use it to predict the value of y when $x = 8$.

Answer: _____

6. Compute the correlation coefficient r for the data set (1, 1), (2, 3), (3, 2), (4, 5), (5, 4). Use $r = S_{xy} / \sqrt{S_{xx} \cdot S_{yy}}$. Give a decimal.

Answer: _____

8. Among 180 students, 30 are left-handed and 12 of those are musicians; the other 150 are right-handed and 30 of those are musicians. Find $P(\text{musician} \mid \text{left-handed}) - P(\text{musician} \mid \text{right-handed})$ as a decimal.

Answer: _____

10. Find the slope of the least-squares line of best fit for the data set (10, 25), (20, 35), (30, 50), (40, 55), (50, 70).

Answer: _____

11. For the data set (10, 25), (20, 35), (30, 50), (40, 55), (50, 70), the least-squares slope is 1.1. Find the y-intercept, then use the resulting line of best fit to predict y when $x = 60$.

Answer: _____

12. In a survey of 500 adults, 45% own a bike. Of the bike owners, 60% also jog. In total, 220 of the 500 adults jog. How many of the non-bike-owners jog?

Answer: _____