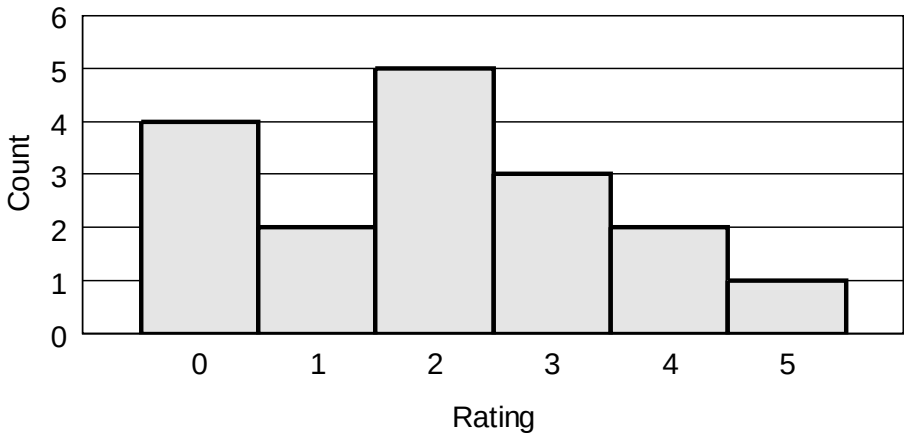
POL 138-003 Quantitative Reasoning in Political Science
KEY Practice Exam 1B · Fall 2025

1. The histogram to the right indicates how a person rated 17 movies on a scale from 0 to 5. In this histogram, which of the following is true?
   A. There is 1 rating of 5.
   B. There are 5 ratings of 1.



2. Which of these is closest to what an inference is?
   A. a logical fallacy
   B. a conclusion
   C. the reason for a prediction

3. Research focusing on numbers is ___.
   A. quantitative research
   B. qualitative research

4. Suppose that the number 99 is added to the set {0,1,2}. That would have more influence on which of the following, for that set of numbers?
   A. mean
   B. median

5. Standard deviation is a measure of ___ a set of numbers.
   A. the validity of
   B. the variation in
   C. the reliability of
   D. the correctness of
   E. the central tendency of

6. The standard deviation of the set of numbers {3, 3, 3} is ___.
   A. less than zero
   B. zero
   C. greater than zero

7. The standard deviation of the set of numbers {-3, -2, -1} is ___.
   A. less than zero
   B. zero
   C. greater than zero

8. Suppose that we have the set of numbers {10, 11, 14}. If we subtract 3 from each number in that set, the standard deviation of the set will ___.
   A. decrease
   B. increase
   C. remain the same

9. Suppose that we have the set of numbers {0, 2, 4}. If we triple each number in that set, the standard deviation of the set will ___.
   A. decrease
   B. increase
   C. remain the same

10. Suppose that a sample has 10 Democrats and 20 Republicans. What formula could be used to correctly calculate the proportion of the sample that is Democrat?
    A. 10 ÷ 20
    B. 20 ÷ 10
    C. (10 + 20) ÷ 10
    D. 10 ÷ (10 + 20)
    E. (10 + 20) ÷ (20 + 10)

11. Suppose that, in 2023, 20% of students at a college are women, but that, in 2024, 30% of students at the college are women. That change can be correctly expressed as an increase of ___.
    A. 10 percent
    B. 10 percentage points

12. Suppose that, in 2023, 20% of students at a college are women, but that, in 2024, 30% of students at the college are women. That change can be correctly expressed as an increase of ___.
    A. 50 percent
    B. 50 percentage points

13. Suppose that a score of 70 is at the 90th percentile for scores on a test. What does this mean?
    A. 70 percent of scores were 90.
    B. 70 percent of scores were below 90.
    C. 70 percent of scores were above 90.
    D. 90 percent of scores were 70.
    E. 90 percent of scores were below 70.
    F. 90 percent of scores were above 70.

14. The probability of X happening is 10%, and the probability of Y happening is 20%. X and Y are independent events. What is the probability that X and Y both occur?
    A. $0.10 + 0.20$
    B. $0.10 - 0.20$
    C. 0.10×0.20
    D. $(0.10 + 0.20) \div 2$
    E. Cannot be determined from the information provided

15. The probability of X happening is 10%, and the probability of Y happening is 20%. X and Y are NOT independent events. What is the probability that X and Y both occur?
    A. $0.10 + 0.20$
    B. $0.10 - 0.20$
    C. 0.10×0.20
    D. $(0.10 + 0.20) \div 2$
    E. Cannot be determined from the information provided

16. Suppose that, in a class of 100 students, 40 students are male, and 60 students are female. Two different students are randomly selected to come to the front of the class at the same time. Which indicates the probability that both students are female?
    A. $(60 \div 100) \times (40 \div 100)$
    B. $(60 \div 100) \times (60 \div 100)$
    C. $(60 \div 100) \times (59 \div 100)$
    D. $(60 \div 100) \times (59 \div 99)$
    E. Cannot be determined from the information provided

17. Suppose that in a class of 100 students, 40 students are male, and 30 students are freshman. Which indicates the probability that a randomly selected student is a male freshman?
    A. $(40 \div 100) \times (30 \div 100)$
    B. $(40 \div 100) \times (29 \div 99)$
    C. $(40 \div 100) \times (29 \div 100)$
    D. Cannot be determined from the information provided

18. Suppose that each student in a class of 50 students takes a two-item test in which Item 1 has response options of A and B, and Item 2 has response options of A, B, C, and D. For each item, only one of the response options is correct. Which of the following calculations, if any, will indicate the number of correct items that students will get on average if the students are randomly guessing a single response to each item?
    A. $1 \div (2 + 4)$
    B. $(1 \div 2) + (1 \div 4)$
    C. $(1 \div 2) \times (1 \div 4)$
    D. $(1 \div 2) \div (1 \div 4)$
    E. $(1 \div 2) \times (3 \div 4)$
    F. $(1 \div 2) \div (3 \div 4)$

19. Which score below indicates a higher degree of political knowledge for a political knowledge test?
    A. scoring at the 10th percentile on the test
    B. scoring at the 50th percentile on the test

20. Academic ability is higher on average among LSAT test-takers than among SAT test-takers. If Amy scored at the 50th percentile on the LSAT among LSAT test-takers, then she should be expected to score ___ on the SAT among SAT test-takers.
    A. less than the 50th percentile
    B. at the 50th percentile
    C. greater than the 50th percentile

21. Suppose that a course has two exams: Exam 1 is worth 40% of the overall grade for the course, and Exam 2 is worth 60% of the overall grade for the course. If a student scored 70% on Exam 1 and 90% on Exam 2, which of the following could be used to correctly calculate that student's overall percentage for the course?
    A. $(40 + 60) \div 2$
    B. $(70 + 90) \div 2$
    C. $(0.40 \times 70) + (0.60 \times 90)$
    D. $(0.40 \times 60) + (0.70 \times 90)$

22. The sample for a research study is better described as which of the following?
    A. the things that are studied
    B. the things that the research study is interested in

23. The population for a research study is better described as which of the following?
    A. the things that are studied
    B. the things that the research study is interested in

24. Which of the following would provide a more credible estimate of the distribution of political ideology among a population of 7 million persons?
    A. a random sample of 800 members of the population
    B. a non-random sample of 1600 members of the population

25. Suppose that we want to test the null hypothesis that support for the Electoral College is higher among Iowa residents than among Illinois residents. Which set of samples below would be better for testing this null hypothesis?
    A. a random sample of 800 Iowa residents and a random sample of 800 Illinois residents
    B. a random sample of 900 Iowa residents and a random sample of 1,600 Illinois residents

26. Political scientists weight survey data for which of the following reasons?
    A. Because the sample is too small
    B. Because the population is much larger than the sample
    C. Because the sample characteristics do not match the population characteristics

27. If Asians are 4 percent of a sample and 8 percent of a population, what weight should be applied to each Asian person in the sample, if weighting on only race?
    A. $4 + 8$
    B. 4×8
    C. $4 \div 8$
    D. $8 \div 4$
    E. None of the above

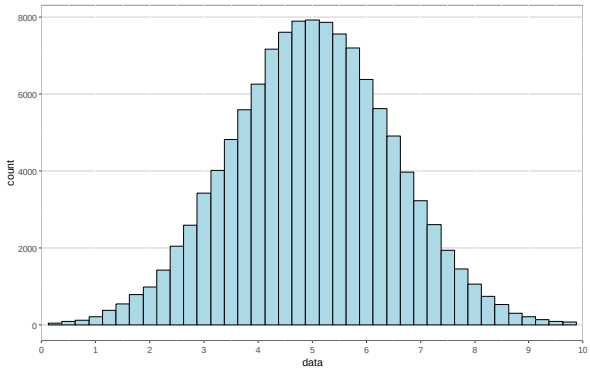
28. If the mean survey weight for a group is 0.6, then that means that the group was ___.
    A. undersampled, relative to the group's percentage of the population
    B. oversampled, relative to the group's percentage of the population
    C. neither undersampled nor oversampled, relative to the group's percentage of the population

29. Suppose that the true mean height of Illinois residents is 5 feet 7 inches. Researcher A randomly samples 100 Illinois residents and accurately measures their height. Researcher B randomly samples 900 Illinois residents and accurately measures their height. Which of the following, if any, should be expected about the mean height in these samples?
    A. The mean height in Researcher A's sample is higher.
    B. The mean height in Researcher B's sample is higher.
    C. Neither of the above.

30. Suppose that the true mean height of Illinois residents is 5 feet 7 inches. Researcher A randomly samples 100 Illinois residents and accurately measures their height. Researcher B randomly samples 900 Illinois residents and accurately measures their height. Which of the following, if any, should be expected about the mean height in these samples?
    A. The mean height in Researcher A's sample is closer to 5 feet 7 inches.
    B. The mean height in Researcher B's sample is closer to 5 feet 7 inches.
    C. Neither of the above.

31. Suppose that Illinois randomly selects ten percent of its citizens to win a prize. Due to random error, the percentage of prize winners is not exactly ten percent in each county. The county that had the highest percentage of prize winners had 14 percent of its residents win a prize. Which county below was more likely to have been this county?
    A. Hardin County, which has 3,550 residents
    B. Cook County, which has 5,200,000 residents

32. The image below is an example of a ___.



A. normal distribution
B. uniform distribution

33. Suppose that a test has a mean of 100 and a standard deviation of 5. Scores on the test follow a normal distribution. About 95% of scores should fall within which two scores?
A. 10 and 100
B. 60 and 140
C. 70 and 130
D. 80 and 120
E. 90 and 110

34. Suppose that scores on a national test follow a normal distribution and have a mean of 100 and a standard deviation of 10. If Student A raises her score from 90 to 100, and Student B raises her score from 100 to 110, which of the following statements is true?
A. Student A had the higher percentile increase on the test.
B. Student B had the higher percentile increase on the test.
C. Student A had the same percentile increase on the test as Student B had.

35. Suppose that scores on a national test follow a normal distribution and have a mean of 100 and a standard deviation of 10. If Student A raises her score from 80 to 90, and Student B raises her score from 90 to 100, which of the following statements is true?
A. Student A had the higher percentile increase on the test.
B. Student B had the higher percentile increase on the test.
C. Student A had the same percentile increase on the test as Student B had.

36. Which of the following 95% confidence intervals is expected to be wider?
A. the 95% confidence interval for the mean weight of a random sample of 100 U.S. residents
B. the 95% confidence interval for the mean weight of a random sample of 900 U.S. residents

37. Which of the following is expected to be wider, for the mean weight of a random sample of 800 U.S. residents?
    A. the 90% confidence interval
    B. the 99% confidence interval

38. Which best indicates what the null hypothesis is?
    A. The hypothesis that is true
    B. The hypothesis being tested
    C. The hypothesis that the effect is not zero
    D. The hypothesis that is most supported by the evidence

39. Of the following, which best describes what a p-value measures?
    A. the precision of an estimate
    B. the strength of evidence against the null hypothesis
    C. the size of an association controlling for other model factors

40. Of the p-values below, which p-value indicates the strongest evidence against a null hypothesis?
    A. $p = 0.08$
    B. $p = 0.52$
    C. $p = 0.99$

41. What is the conventional p-value threshold in political science?
    A. 0.01
    B. 0.05
    C. 0.50
    D. 0.95
    E. 1

42. If we flipped a coin and got 20 heads and 0 tails, what would be the p-value for a statistical test of the null hypothesis that the coin is fair?
    A. 0
    B. 1
    C. something between 0 and 1

43. If we flipped a coin and got 20 heads and 20 tails, what would be the p-value for a statistical test of the null hypothesis that the coin is fair?
    A. 0
    B. 1
    C. something between 0 and 1

44. If we flipped a coin and got 2 heads and 18 tails, what would be the p-value for a statistical test of the null hypothesis that the coin is fair?
    A. 0
    B. 1
    C. something between 0 and 1

45. Suppose that data from a random sample of 200 persons provides some evidence against the null hypothesis, with a p-value of p=0.70. Suppose that all else were equal in the calculation of the p-value, but the standard deviation of measurements was smaller. This would be expected to result in a p-value that is ___.
    A. less than p=0.70
    B. equal to p=0.70
    C. higher than p=0.70

46. If the p-value for a test of a null hypothesis is p=0.03, then we should do which of the following?
    A. accept the null hypothesis and accept the alternative hypothesis
    B. reject the null hypothesis and reject the alternative hypothesis
    C. accept the null hypothesis and reject the alternative hypothesis
    D. reject the null hypothesis and accept the alternative hypothesis
    E. none of the above

47. If the p-value for a test of a null hypothesis is p=0.97, then we should do which of the following?
    A. accept the null hypothesis and accept the alternative hypothesis
    B. reject the null hypothesis and reject the alternative hypothesis
    C. accept the null hypothesis and reject the alternative hypothesis
    D. reject the null hypothesis and accept the alternative hypothesis
    E. none of the above

48. Suppose that we are testing a null hypothesis. If we want to be extra certain before rejecting the null hypothesis, which p-value threshold below would be more appropriate?
    A. p=0.01
    B. p=0.10

49. Suppose that we conduct 900 well-designed independent tests of a null hypothesis. In reality, the null hypothesis is true. What is the expected percentage of these tests that are expected to have a p-value of $p<0.05$?
    A. 0%
    B. 5%
    C. 50%
    D. 95%
    E. 100%

50. A researcher tested the null hypothesis that an association is zero. The p-value for this test is p=0.01. Based on this p-value, which of the following should the researcher do, using the conventional level in political science?
    A. conclude that the association is zero
    B. conclude that the association is not zero
    C. neither of the above

51. A researcher tested the null hypothesis that an association is zero. The p-value for this test is p=0.70. Based on this p-value, which of the following should the researcher do, using the conventional level in political science?
    A. conclude that the association is zero
    B. conclude that the association is not zero
    C. neither of the above

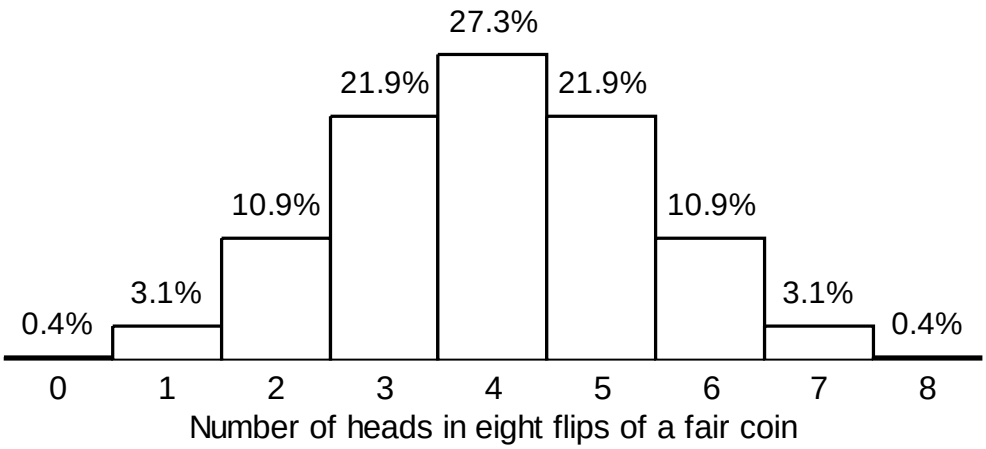
52. For a test of the null hypothesis that there is no association, "statistically significant evidence" for the association refers to sufficient evidence that the association ___.
    A. exists
    B. is large
    C. is important

53. If the p-value is p=0.00001 for a single statistical test of a null hypothesis that there is no association, do we have enough evidence to claim that the association is large?
    A. Yes
    B. No

54. If the p-value is p=0.00001 for a single statistical test of a null hypothesis that there is no association, do we have enough evidence to claim that there is statistically significant evidence for the detected association?
    A. Yes
    B. No

55. Suppose that data from a random survey of LSAT test-takers indicated that LSAT test-takers who attended an LSAT prep session scored 10 points higher on average than LSAT test-takers who did not attend an LSAT prep session. The p-value is p=0.01 for a test of the null hypothesis that the mean LSAT score does not differ between these two groups. Does this analysis contain sufficient evidence to conclude, at the conventional level in political science, that, at least among LSAT test-takers in this analysis and at least on average, attended an LSAT prep session caused LSAT test-takers to have a higher LSAT score?
    A. Yes
    B. No

56. The histogram indicates the percentage of times that a fair coin is expected to land on the indicated number of heads in eight flips. Note that 3.1% is written as 0.031 as a decimal.



Based on the above, which calculation indicates the p-value that would occur for a test of the null hypothesis that a coin is fair, if the coin landed on 6 heads in 8 flips?

A. 0.109
B. 0.109 + 0.109
C. 0.109 + 0.031 + 0.004
D. 0.109 + 0.031 + 0.004 + 0.109 + 0.031 + 0.004
E. 0.031 + 0.109 + 0.219 + 0.273 + 0.219 + 0.109 + 0.031

The output is from a linear regression on data from the ANES 2024 Time Series Study that used a participant's age in years (in a variable called AGE) to predict the participant's rating about Democrats on a 0-to-100 scale (FTDEM). Each participant in the dataset had an age between 18 years old and 80 years old.

	Estimate	p-value
(Intercept)	39.92	<0.0001
AGE	0.12	<0.0001

57. What does the 39.92 intercept coefficient indicate?

A. The predicted rating about Democrats among all respondents
B. The predicted rating about Democrats among respondents aged 0
C. The predicted rating about Democrats among respondents aged 18

The output is from a linear regression on data from the ANES 2024 Time Series Study that used a participant's age in years (in a variable called AGE) to predict the participant's rating about Democrats on a 0-to-100 scale (FTDEM). Each participant in the dataset had an age between 18 years old and 80 years old.

	Estimate	p-value
(Intercept)	39.92	<0.0001
AGE	0.12	<0.0001

58. What does the 0.12 coefficient for AGE indicate?
    A. The predicted rating about Democrats is 0.12 among participants aged
    B. The predicted rating about Democrats is 0.12 among participants aged 18
    C. The predicted rating about Democrats is 0.12 units higher among older participants than among younger participants
    D. For each one-unit increase in the AGE predictor, the predicted rating about Democrats increases by 0.12 units

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The output is from a linear regression on data from the ANES 2024 Time Series Study that used a participant's age in years (in a variable called AGE) to predict the participant's rating about Democrats on a 0-to-100 scale (FTDEM). Each participant in the dataset had an age between 18 years old and 80 years old.

	Estimate	p-value
(Intercept)	39.92	<0.0001
AGE	0.12	<0.0001

59. Which of the following is a correct linear regression equation for the output, using X and Y?
    A. $Y = 0.12X + 39.92$
    B. $Y = 0.12 + 39.92X$
    C. $Y = 0.12X + 39.92X$
    D. $Y = 39.92 \div 0.12X$

The output is from a linear regression on data from the ANES 2024 Time Series Study that used a participant's age in years (in a variable called AGE) to predict the participant's rating about Democrats on a 0-to-100 scale (FTDEM). Each participant in the dataset had an age between 18 years old and 80 years old.

	Estimate	p-value
(Intercept)	39.92	<0.0001
AGE	0.12	<0.0001

60. Which formula can be used to estimate the predicted rating about Democrats among participants age 50?
    A. $0.12 + (50 \times 39.92)$
    B. $(0.12 \times 50) + 39.92$
    C. $(39.92 \times 0.12) - 50$

The output is from a linear regression on data from the ANES 2024 Time Series Study that used a participant's age in years (in a variable called AGE) to predict the participant's rating about Democrats on a 0-to-100 scale (FTDEM). Each participant in the dataset had an age between 18 years old and 80 years old.

	Estimate	p-value
(Intercept)	39.92	<0.0001
AGE	0.12	<0.0001

61. Did the analysis provide sufficient evidence to conclude, at the conventional level in political science, that age correlated with a person reporting a higher rating about Democrats, at least on average among participants in the sample?
    A. Yes
    B. No

The output is from a linear regression on data from the ANES 2024 Time Series Study that used a participant's age in years (in a variable called AGE) to predict the participant's rating about Democrats on a 0-to-100 scale (FTDEM). Each participant in the dataset had an age between 18 years old and 80 years old.

	Estimate	p-value
(Intercept)	39.92	<0.0001
AGE	0.12	<0.0001

62. Did the analysis provide sufficient evidence to conclude, at the conventional level in political science, that getting older caused a person to report a higher rating about Democrats, at least on average among participants in the sample?
    A. Yes
    B. No

The output is from a linear regression on data from the ANES 2024 Time Series Study that used a participant's race (in a variable called RACE, coded into categories of White, Black, Hispanic, and Other) to predict the participant's rating about Democrats on a 0-to-100 scale (FTDEM).

FTDEM	Coefficient	p-value
RACE		
White	24.20	0.000
Hispanic	13.60	0.000
Other	20.56	0.000
intercept	24.47	0.000

63. The coefficient estimate for the intercept indicates that the mean rating about feminists is predicted to be 24.47 ___.
    A. among the average respondent
    B. among the average White respondent
    C. among the average Black respondent
    D. among the average Hispanic respondent

The output is from a linear regression on data from the ANES 2024 Time Series Study that used a participant's race (in a variable called RACE, coded into categories of White, Black, Hispanic, and Other) to predict the participant's rating about Democrats on a 0-to-100 scale (FTDEM).

FTDEM	Coefficient	p-value
RACE		
White	24.20	0.000
Hispanic	13.60	0.000
Other	20.56	0.000
intercept	24.47	0.000

64. The coefficient estimate for the Hispanic category indicates that the mean rating about Democrats is 13.60 ___.
    A. among the average respondent
    B. among the average Hispanic respondent
    C. higher for Hispanic respondents than for non-Hispanic respondents
    D. higher for Hispanic respondents than for Black respondents