

Statistics & Data Analysis

Identify the type of sampling method described.

1. Kevin wants to find out the opinions of college students about the availability of parking spaces. He surveys students as they walk by his car. Convenience
2. A yearbook editor wants to know what type of cover the students prefer for the new yearbook. Every fifth student on an alphabetical list is surveyed. Systematic
3. A baseball league wants to know who the fans think was the league's best pitcher. Fans are asked to vote on the league's website. Self-Selected
4. School counselors want to know how effective college counseling is based on current practices. They use a random number generator to select 50 seniors from AHS, then call them to the office to complete the survey.

Simple Random

Tell whether the sample is biased or unbiased. Explain!

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Biased depending on where he stands

unbiased

7. Find the margin of error and give an interval that is likely to contain the exact percent for a survey with the given sample size.

Sample size: 585; 38% of those surveyed will vote YES on the referendum.

MOE $\pm 4.1\%$ $33.9\% - 42.1\%$

8. Find the sample size required to achieve the given margin of error.

$\pm 2.5\%$ 1600 Sample Size

9. In a recent telephone poll, a major news agency found that, including margin of error, between 46% and 54% of voters plan to the vote for the Democratic presidential candidate. What sample size did the news agency use in conducting the poll?

$$\frac{54}{8\%}$$

$$\frac{8\%}{2} = 4\%$$

625 polled

Tell whether the study is an experimental study or an observational study. Explain your reasoning!

10. A health teacher at a large school wants to study the effects of regular swimming on a student's ability to hold his or her breath. The control group

consists of students who are not on the swim team. The experimental group consists of students who are on the swim team. *Observational*

11. A manager wants to study the effects that positive reinforcement has on an employee's willingness to work overtime. The control group is employees who are given no reinforcement. The experimental group is employees who are given positive reinforcement during their weekly meeting with the manager.

Experiment

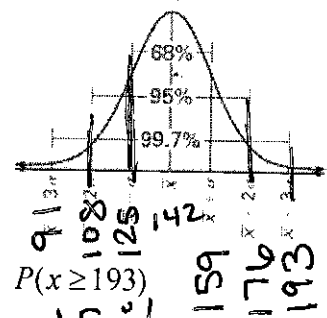
12. Which question is not a biased question? Choose the BEST answer.

- a) You don't like this pair of jeans, do you? *biased*
- b) Don't you agree that the new rule is a problem? *biased*
- c) Do you watch movies directed by Steven Spielberg? *unbiased*
- d) Is green your favorite color? *unbiased*

13. A math company conducts an experiment to determine whether students suffer from math anxiety. The experimental group consists of students enrolled in a mathematics program. The control group consists of students enrolled in an art history program. (a) Identify any flaws in the experiment and (b) state how they can be corrected. *A) Not comparing same subject.*

B) use only math student

A normal distribution has mean and standard deviation. Find the indicated probability for a randomly selected x value from a distribution where $\mu = 142$, $\sigma_x = 17$

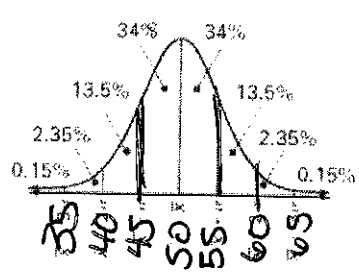


14. $P(x \leq 108)$
2.5%

15. $P(x \geq 193)$
.15%

16. $P(125 \leq x \leq 176)$
81.5%

A normal distribution has a mean of 50 and a standard deviation of 5. Find the probability that a randomly selected x-value from the distribution is on the given interval.



17. Between 45 and 55
68%

18. At least 45
84%

19. At most 60
97.5%

A normal distribution has a mean of 112.8 and a standard deviation of 9.3. Use the standard normal table to find the indicated probability for a randomly selected x-value from the distribution.

20. $P(x \leq 104.3)$

$z = -0.91$.1811

21. $P(x \geq 97.6)$

$z = -1.63$.0516

22. $P(123.1 \leq x \leq 142.3)$

$z = \frac{123.1 - 112.8}{9.3} = 1.11$ and $z = \frac{142.3 - 112.8}{9.3} = 3.14$
 $.1333$ (from 1.11) and $.0008$ (from 3.14)
 $.1333 - .0008 = .1325$

23. An average light bulb manufactured by the Acme Corporation lasts 300 days with a standard deviation of 50 days.

a. Which interval contains the area that falls within one standard deviation of the mean?

250 - 350 day

b. Which interval contains the area that falls within two standard deviations of the mean?

200 - 400 days

c. Which interval contains the area that falls within three standard deviations of the mean?

150 - 450 days

24. Raw scores on tests are often transformed into standard (z) scores for easier comparison. A test of reading ability has mean 75 and standard deviation 10 when given to third-graders. Sixth-graders have mean score 82 and standard deviation 11 on the same test.

John is a third-grader who scores 78 on the test. Nadine is a sixth-grade student scores 81. Calculate the z-score for each student. Who scored higher within his or her grade?

$\frac{78 - 75}{10} = .3$

$\frac{81 - 82}{11} = -0.09$

John

25. Four hundred (400) bowling scores gathered at a bowling alley had a normal distribution with a mean of 130 and a standard deviation of 19. How many scores fell between 85 and 136?

$\frac{85 - 130}{19} = -2.37$

$\frac{136 - 130}{19} = 0.32$

.6166 (400)

247 Scores

26. Use the following data set to answer A & B; round answers to the nearest hundredth: 14, 56, 60, 72, 56, 48, 65

a. Find the mean, standard deviation, variance, mode, and range.

mean 53 standard deviation 17.39 variance 302.41
 mode 56 range 58

b. List the 5-number summary, sketch a box-and-whisker plot; also give the interquartile range (IQR).

5-Number Summary

min : 14

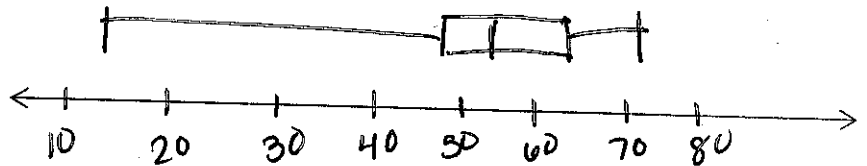
Q₁ : 48

med : 56

Q₃ : 65

Max : 72

IQR: 17



27. A data set has a mean of 15 and a standard deviation of 3, give an example of an outlier and explain your answer.

$$\begin{aligned} 15 + 3 &= 18 \\ 18 + 3 &= 21 \\ 21 + 3 &= 24 \end{aligned}$$

30 b/c above 3st. dev.

28. In the accompanying display, which distribution has the larger mean and which has the larger standard deviation? Explain!

