Math 9 Statistics Canvas

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- Statistics in society
- Population versus sample, bias, ethics, sampling techniques, misleading stats
- Analyzing a given set of data (and/or its representation) and identifying potential problems related to bias, use of language, ethics, cost, time and timing, privacy, or cultural sensitivity
- Using First Peoples data on water quality, Statistics Canada data on income, health, housing, population

1. What is the average of the numbers $10, 20, 80, 30$?

2. What is the mean of the numbers $2, 4, 9$?

3. Consider the numbers $2, 5, k$. Given the mean is 6, find k.

4. Find the median of the numbers $1, 2, 4, 10, 50, 1000, 999999$.

5. Find the median of the numbers $2, 10, 20, 5000$.

6. Find the median of the numbers $-20, 0, 100, 50, -1000$.

7. Find the range of the numbers $10, -20, 5, 100$.

8. Find the average of the numbers $0.5, \frac{3}{2}, -8$, and 2000%.
   Answer as a decimal number.

9. A researcher wants to know the average income of all households in British Columbia. They randomly select 500 households from Vancouver and use their data to represent the province. What is the population in this scenario?
    A. All households in BC
    B. The average income of households in Vancouver
    C. All households in Vancouver
    D. The 500 selected households in Vancouver

10. A student council wants to know what school lunch options students prefer. They survey every 10th student who enters the cafeteria. Which sampling technique is being used?
    A. Stratified sampling
    B. Self-selected sampling
    C. Convenience sampling
    D. Systematic sampling

11. A survey question asks: 'Given that sugary drinks cause tooth decay and weight gain, do you support banning them in schools?' What type of bias is most evident in this question?
    A. Timing bias
    B. Sampling bias
    C. Cultural sensitivity bias
    D. Use of leading language

12. Why might a convenience sample of 50 people outside a local skate park produce unreliable data when estimating the favorite weekend activity for all teenagers in a city?
    A. It relies on voluntary response rather than systematic intervals.
    B. It guarantees that every teenager in the city has an equal chance of being chosen.
    C. It uses too large a sample size, making the data mathematically unstable.
    D. It introduces sampling bias because the group surveyed shares a specific common interest.

13. An advertisement claims that a toothpaste brand is recommended by '9 out of 10 dentists.' However, the fine print reveals that the survey only included 10 dentists chosen by the company. Which ethical or misleading practice is most likely at play?
    A. Using a truncated vertical axis on a bar graph
    B. Using an extremely small and non-representative sample size
    C. Applying systematic sampling errors to random variables
    D. Failing to convert fractions into percentages correctly

14. A bar graph shows a company's profits doubling from one year to the next. However, the vertical axis starts at $1,000,000 instead of $0, making a 5% increase look massive. What visual deception is used here?
    A. A truncated axis
    B. Confusing correlation with causation
    C. Double-bar scaling error
    D. Pictograph distortion

15. A researcher wants to survey high school students about study habits. They divide the student body into grade levels (Grade 9, 10, 11, 12) and randomly select a proportional number of students from each grade. What sampling method is this?
    A. Convenience sampling
    B. Stratified sampling
    C. Simple random sampling
    D. Self-selected sampling

16. When publishing survey data about public health, a researcher ensures participants' personal names and addresses are never linked to their responses. Which ethical principle is being upheld?
    A. Confidentiality and privacy
    B. Avoiding truncated graph axes
    C. Eliminating all forms of question bias
    D. Maximizing sample size requirements

17. A study finds a strong positive correlation between ice cream sales and shark attacks in coastal towns. A newspaper headline claims: 'Eating ice cream attracts sharks!' What logical error has been committed?
    A. Using a convenience sample size
    B. Assuming causation from correlation
    C. Using a pictograph with uneven scaling
    D. Failing to use a systematic interval

18. An online news outlet posts an optional poll on its website asking readers if they support a new tax. Over 10,000 people vote, and 85% say no. Why is this sample likely biased?
    A. It relies on voluntary response, attracting people with strong negative opinions.
    B. It uses a strict systematic interval that ignores demographic strata.
    C. The sample size of 10,000 is far too small to yield any meaningful data.
    D. The vertical axis of the results graph was truncated.

19. What is the median household income in BC, Canada?
    A. $\$45,000$
    B. $\$65,000$
    C. $\$85,000$
    D. $\$105,000$

20. What is the nationwide median household income in China in Canadian dollars?
    A. $10,000
    B. $\$20,000$
    C. $\$40,000$
    D. $\$80,000$

21. What is the median cost of an apartment in the Fraser Valley?
    A. $230,000
    B. $460,000
    C. $920,000
    D. $1.8 million

22. Which is larger, the average or median net worth of Canadian households?
    A. Average
    B. Median

23. How many times richer are typical Canadian homeowners than renters aged 55 to 64?
    A. 2 times
    B. 5 times
    C. 15 times
    D. 30 times

24. What is the population of Canada?
    A. 12 million
    B. 22 million
    C. 32 million
    D. 42 million

25. What percent of BC students graduate with a Dogwood Diploma?
    A. 60%
    B. 70%
    C. 80%
    D. 90%

26. What percentage of Canadians (aged 25 to 64) have a bachelor's degree or higher?
    A. 25%
    B. 33%
    C. 50%
    D. 60%

27. If the national debt were divided equally among Canadians, how much would each person owe?
    A. $8,000
    B. $16,000
    C. $32,000
    D. $64,000

28. Approximately what percent of public water systems in First Nations communities currently meet guidelines for Canadian drinking water quality?
    A. 10%
    B. 50%
    C. 90%
    D. 97%