West Virginia Mathematics

Applied Statistics

Adopted 2024

Applied Statistics

Exploring Data

1. Select appropriate graphical and numerical methods to explore data. AS.ED.1
    1. Generate appropriate ways to display various types of data. M.ASHS.1
    2. Calculate appropriate measures of center, variability, and position for data. M.ASHS.2
    3. Use graphical displays and summary statistics to make conclusions. Informally develop the concept of statistical significance; a result that is unlikely to have occurred by chance alone. M.ASHS.3
    4. Represent data in two variables to model relationships between quantities. M.ASHS.4
    5. Select a function that models a relationship between two quantities and interpret key features of graphs and tables in terms of the quantities. M.ASHS.5
    6. Compare characteristics of two data sets each represented in different ways (algebraically, graphically, numerically, and verbally). M.ASHS.6
    7. Use appropriate measures of center and spread to describe a distribution. M.ASHS.7

Designing Studies

1. Design and implement a plan to collect and analyze data. AS.DS.1
    8. Develop a process for making inferences about population parameters based on a random sample through data collection and analysis. M.ASHS.8
    9. Evaluate the results from a given data-generating process to determine consistency between theoretical and experimental probabilities. M.ASHS.9
    10. Recognize the purposes of and differences among sample surveys, experiments, and observational studies. Explain the importance of randomization in each method. M.ASHS.10
    11. Use data from a sample survey to estimate a population mean or proportion. M.ASHS.11
    12. Design and conduct an experiment to compare two treatments. M.ASHS.12

Functions and Modeling

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1. Explore expressions, functions, and models to describe numbers or relationships. AS.FM.1

    13. Create equations and inequalities in one variable, representing linear, exponential, quadratic, and simple rational functions, and use them to solve problems. M.ASHS.13

    14. Develop the concept of a complex number i such that $i^2 = -1$. Understand that every complex number can be written in the form a + bi with a and b real. M.ASHS.14

    15. Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers. M.ASHS.15

    16. Use the structure of polynomial and rational expressions to identify ways to rewrite them. M.ASHS.16

    17. Identify zeros of polynomials when suitable factorizations are available and use the zeros to construct a rough graph of the function defined by the polynomial. M.ASHS.17

    18. Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions. M.ASHS.18

    19. Solve simple rational and radical equations in one variable and give examples showing how extraneous solutions may arise. M.ASHS.19

    20. Rearrange formulas to highlight a quantity of interest, using the same reasoning as i solving equations (e.g., solve for σ and Margin of Error = for n). M.ASHS.20

    21. Select a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative extrema; symmetries; and end behavior. M.ASHS.21

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2. Use probability to evaluate outcomes and make decisions. AS.FM.2

    22. Connect sampling variability and margin of error to generate and interpret plausible parameter values. M.ASHS.22

    23. Interpret results from a randomized experiment comparing two treatments. Use simulations to decide if experimental results are significant. M.ASHS.23

    24. Evaluate claims based on data reports. M.ASHS.24

    25. Use probability rules to make fair decisions. M.ASHS.25

    26. Use two-way tables, tree diagrams, Venn diagrams, or 10 x 10 grids to model probabilities. M.ASHS.26

    27. Justify a decision using probability rules (e.g., product testing, medical testing, weather forecasting, marketing, or sports coaching decisions). M.ASHS.27

    28. Perform appropriate calculations for given outcomes and decisions based on expected values for non-normal distributions. M.ASHS.28

    29. Given data from a normal distribution, use the mean and standard deviation to estimate population percentages. Use calculators, spreadsheets, and tables to estimate areas under the normal curve. Recognize that there are data sets for which such a procedure is not appropriate. M.ASHS.29