

Unit	Lesson	Lesson Objectives
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Basics of Probability**Understanding Probability**

Describe the probability of an event as a number between 0 and 1, which represents the likelihood of the event.

Identify an event with a given probability as impossible, unlikely, likely, or certain.

Use the fact that the sum of the probabilities of all possible outcomes is 1 to find the probabilities of complementary events.

Sets and Venn Diagrams

Identify and represent elements of sets and subsets, including the empty and universal sets.

Represent and interpret the union and intersection of sets using set notation and Venn diagrams.

Permutations and Combinations

Distinguish between permutation problems and combination problems.

Solve problems involving permutations or combinations.

Finding Outcomes

Evaluate expressions involving factorials.

Identify possible outcomes for an event.

Solve combination problems including finding a subset of the total number of possible combinations.

Solve permutation problems including finding a subset of the total number of possible permutations.

Geometric Probability

Calculate geometric probabilities.

Identify the probability of landing in a given region of a geometric figure as impossible, unlikely, likely, or certain.

Theoretical Probability

Express the theoretical probabilities of given outcomes of an experiment as a ratio.

Use a given sample space to calculate the theoretical probabilities of events.

Use theoretical probability to make predictions.

Experimental Probability

Find the experimental probability of an event, expressing it as a ratio.

Use experimental probability to make predictions.

Performance Task: Geometric Probability Models**Probability****Experimental vs. Theoretical Probability**

Compare experimental results to theoretical probabilities and make conjectures about the results.

Explain possible sources of discrepancy between the theoretical and experimental probability of an event.

Compound Events and Sample Space

Determine outcomes in a sample space that represents a given compound event.

Identify the sample space for an experiment involving compound events.

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		<p>Compound Events and the Fundamental Counting Principle</p> <ul style="list-style-type: none">Use the fundamental counting principle to determine the number of possible outcomes.Use the fundamental counting principle to determine the probability of compound events. <p>Probability of Compound Events</p> <ul style="list-style-type: none">Find probabilities of dependent compound events using organized lists, tables, or tree diagrams.Find probabilities of independent compound events using organized lists, tables, or tree diagrams. <p>Simulations to Estimate Probabilities</p> <ul style="list-style-type: none">Design a simulation to experimentally determine the probability of compound events.Use a simulation to generate frequencies for compound events; e.g., use a coin to simulate the gender of a baby and find the experimental probability of having exactly 1 boy in a family of three children.
		<p>Applications of Probability</p> <p>Theoretical and Experimental Probability</p> <ul style="list-style-type: none">Calculate theoretical and experimental probability.Identify the sample space of an experiment and the complement of an event. <p>Independent and Mutually Exclusive Events</p> <ul style="list-style-type: none">Calculate probabilities using the addition rule.Calculate probabilities using the multiplication rule of independent events.Identify mutually exclusive and independent events. <p>Probability of Independent Events</p> <ul style="list-style-type: none">Calculate probabilities using tree diagrams or the multiplication rule of independent events.Determine if compound events are independent or dependent. <p>Conditional Probability</p> <ul style="list-style-type: none">Calculate conditional probabilities using formulas and Venn diagrams.Calculate probabilities of compound events.Use calculations to determine if two events are independent. <p>Probability and Two-Way Tables</p> <ul style="list-style-type: none">Compute conditional probabilities from data displayed in a two-way table.Construct a two-way table.Use a two-way table to determine if two events are independent. <p>Probability with Combinations and Permutations</p> <ul style="list-style-type: none">Identify expressions that represent probabilities of compound events.Use combinations to compute probabilities of compound events.Use permutations to compute probabilities of compound events.

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		Properties of Probability Distributions <ul style="list-style-type: none">Create probability distributions from a data set.Identify properties of a probability distribution.Solve problems using probability distributions.
		Performance Task: Applying Probability Concepts
		Data Distributions
		Plotting Data on a Dot Plot <ul style="list-style-type: none">Display data on a dot plot.Distinguish between statistical and nonstatistical questions.
		Describing Data on Dot Plots <ul style="list-style-type: none">Describe a data set as shown on a dot plot, using the center, spread, and overall shape.
		Analyzing Dot Plots <ul style="list-style-type: none">Analyze two dot plots with similar variation by comparing the measures of center.Informally compare shapes of two different data distributions with similar variations.
		Representing Data Sets with Histograms <ul style="list-style-type: none">Describe a data set as shown on a histogram, using the center, spread, and overall shape.Display data on a histogram.
		Finding the Mean <ul style="list-style-type: none">Calculate the mean of a set of data.Explain how the mean of a set of data is a balance point.Find a missing value in a set of data given the mean.
		Comparing Mean and Median <ul style="list-style-type: none">Choose the most appropriate measure of center to describe a set of data.Describe the impact of outliers on the mean and median.Find the median of a set of data.
		Range and Interquartile Range <ul style="list-style-type: none">Define and find the interquartile range of a set of data.Define and find the range of a set of data.Describe the impact of outliers on the range and interquartile range.
		Box Plots <ul style="list-style-type: none">Create a box plot to represent a set of data, given the summary statistics.Interpret a box plot.
		Box Plots <ul style="list-style-type: none">Analyze box plots for symmetry and outliers.Compare box plots.Create and interpret box plots.

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		Mean Absolute Deviation <ul style="list-style-type: none">Calculate the mean absolute deviation for a set of data.Describe the impact of outliers on the mean absolute deviation.Interpret the mean absolute deviation of a set of data.
		Sampling and Comparing Populations
		Populations and Sampling <ul style="list-style-type: none">Determine when sampling is an appropriate and helpful measure of a population and when it is not.Explain that statistics can be used to gain information about a population by examining a sample of the population.
		Sampling Methods <ul style="list-style-type: none">Compare a random sample to a biased sample in a variety of real-world contexts to determine validity.Identify and explain the process for choosing a random sample.
		Inferences and Predictions <ul style="list-style-type: none">Examine sample size and the effect on a prediction using the results of a simulation.Make an inference about the whole population based on a sample by using proportional reasoning.
		Multiple Samples <ul style="list-style-type: none">Compare samples generated from simulations to draw an inference about a population.Use a simulation to generate multiple samples of the same size.
		Variation in Predictions and Estimates <ul style="list-style-type: none">Analyze the results of multiple samples by comparing the means of samples and populations.Describe variations in estimates or predictions of multiple samples.
		Designing a Study <ul style="list-style-type: none">Analyze study types and sampling methods.Classify sampling methods.Classify study types.Determine if a sample is biased.
		Expected Value <ul style="list-style-type: none">Calculate expected values.Use expected values to make decisions.
		Binomial Distribution <ul style="list-style-type: none">Calculate binomial probabilities.Identify a binomial experiment.Identify the probability of success, probability of failure, and number of trials for a binomial experiment.
		Data Analysis
		Summarizing Data Sets with Statistics <ul style="list-style-type: none">Compare two data sets with the same measure of center but different measures of spread.Find the mean, median, range, and interquartile range of a data set.

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		Data Displays and Statistics <ul style="list-style-type: none">Compare two data sets using measures of center and spread.Describe the impact of the number of observations on the shape of the data.Interpret the shape of a data set in the context of the way in which data was collected.
		Comparing Measures of Center and Variability <ul style="list-style-type: none">Analyze two numerical data distributions with similar variation by calculating and comparing the measures of center to the measure of variability.Compare the measures of center of two sets of data using a multiple of the measure of variability, expressed as a ratio.Draw an informal comparative inference about two sets of data.
		Comparing Box Plots <ul style="list-style-type: none">Compare two data sets by comparing the difference in the measures of center and the measures of variability.Compare two data sets with different numbers of data points by comparing two box plots.Draw an informal comparative inference about two sets of data.
		Describing Data <ul style="list-style-type: none">Determine if a sample fairly represents the population as a whole or if there is bias.Identify various data collection methods and analyze various displays of data.Informally describe the shape, center, and variability of a distribution based on a dot plot, histogram, or box plot.
		Measures of Center <ul style="list-style-type: none">Calculate the mean and median for a set of data using technology when appropriate.Compare the mean and median of a set of data that is symmetrical and for a set of data that is not symmetrical, determining which is a better measure of center for a given data set.Create a dot plot or histogram for a set of data.Discuss the effect of outliers on measures of center.
		Comparing Data Sets <ul style="list-style-type: none">Choose which measure of center, measure of variability, and display should be used to describe a data set.Compare two distributions in terms of center, variability, and shape.
		Representing Data <ul style="list-style-type: none">Describe a data set using measures of central tendency and range.
		Performance Task: Exciting Entertainment
		Constructing Scatterplots
		Constructing Scatterplots <ul style="list-style-type: none">Analyze a scatterplot.Classify dependent and independent variables.Create a scatterplot using a table of values.

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Interpreting Clusters and Outliers

- Analyze the influence outliers and clusters have on the data set.
- Explain the meaning of clusters and outliers in context.
- Identify clusters and outliers in a scatterplot and table of values.

Exploring Association

- Analyze the correlation and association in scatterplots.

Drawing Trend Lines

- Draw a line of best fit in scatterplots and identify its purpose.
- Use a graphing calculator to graph scatterplots and draw the trend line.

Using Equations to Represent Trend Lines

- Create the linear equation of the trend line.
- Find and interpret the slope of a trend line.

Making Predictions

- Analyze data to determine interpolations and extrapolations.
- Substitute x - and y -values into the data to create predictions of a real-world scenario.
- Use a calculator to graph a scatterplot and create line of best fit.

Analyzing Scatterplots**Line of Best Fit**

- Determine if a data set shows a correlation and, if so, the type of correlation.
- Determine if a given linear function is a reasonable model for a set of data arising from a real-world situation.
- Use a line of best fit to make a prediction.
- Use technology to determine the line of best fit for a data set, and interpret the parameters of the model in context.

Analyzing Residuals

- Analyze the residual plot to determine whether the function is an appropriate fit for a linear model.
- Compute the residuals for a set of data and a line of best fit.
- Determine the residual plot for a given scatterplot and line of best fit.

Strength of Correlation

- Analyze data to draw conclusions about correlation and causation.
- Calculate the correlation coefficient for a linear model using technology.
- Interpret the strength of a linear model based on the correlation coefficient.

Regression Models

- Determine an exponential, quadratic, or linear model for a given data set using technology.
- Identify limitations of models in real-world contexts.
- Interpret the graph of a regression model in the context of the problem.
- Use a linear, quadratic, or exponential regression model to make a prediction.

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Comparing Data Sets

- Analyze data sets using the trend line.
- Compare and contrast sets of data.

Performance Task: Super Survey Simulator**Two-Way Tables and Statistics****Making Two-Way Tables**

- Create a two-way table that organizes bivariate data.
- Determine the variables of a scenario in bivariate data.
- Label components of the two-way table appropriately.

Interpreting Two-Way Tables

- Interpret and analyze a two-way table.
- Use frequencies to describe a possible association between two variables.

Two-Way Tables

- Calculate relative frequencies and display them in a two-way relative frequency table.
- Display data in a two-way frequency table given a scenario or Venn diagram, and identify joint and marginal frequencies.
- Interpret joint and marginal relative frequencies in the context of the data.

Relative Frequencies and Association

- Create conditional relative frequency tables, by row and by column.
- Determine whether there is an association between two variables by analyzing conditional relative frequencies.
- Interpret conditional relative frequencies in the context of the data.

Standard Deviation

- Analyze a normal distribution curve to determine statistical measures.
- Analyze histograms for skewness and symmetry.
- Calculate variance and standard deviation for a given data set.

Introduction to Normal Distributions

- Apply the z-score formula to solve problems.
- Describe normal distributions using the mean and standard deviation.
- Solve problems using the empirical rule.

Applications with Standard Normal Distribution

- Solve problems using the standard normal table.

Statistical Inferences

- Make inferences about a population from a sample.

Hypothesis Testing

- Determine if a result is statistically significant.
- Perform hypothesis tests on normally distributed data.