

# Pre-AP Mathematics Grade 7

## 4<sup>th</sup> Nine Weeks Scope and Sequence

<b>Content Standards</b>	<b>Dates Taught</b>	<b>% of Students scoring over 70%</b>	<b>Dates Re-taught (Optional)</b>	<b>Formative and Summative Assessments/ (Any Additional Comments Optional)</b>
<b>Statistics and Probability</b>				
<p>23. Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. [7-SP7]</p> <p>a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. [7-SP7a]</p> <p><b>Example:</b> If a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.</p> <p>b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. [7-SP7b]</p> <p><b>Example:</b> Find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?</p>				
<p>24. Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. [7-SP8]</p>				

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<p>24a. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. [7-SP8a]</p> <p>b. Represent sample spaces for compound events using methods such as organized lists, tables, and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event. [7-SP8b]</p> <p>c. Design and use a simulation to generate frequencies for compound events. [7-SP8c]</p> <p><b>Example:</b> Use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?</p>				
<p>17. Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences. [7-SP1]</p>				
<p>18. Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. [7-SP2]</p> <p><b>Example:</b> Estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.</p>				

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<p>20. Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. [7-SP4]</p> <p><b>Example:</b> Decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.</p>				
<b>Statistics and Probability (Course of Study Grade 8)</b>				
<p>25. Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. [8-SP1]</p>				
<p>26. Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line. [8-SP2]</p>				
<p>27. Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. [8-SP3]</p> <p><b>Example:</b> In a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.</p>				
<p>28. Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. [8-SP4]</p>				

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<p><b>28. Example:</b> Collect data from students in your class on whether or not they have a curfew on school nights, and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?</p>				
<p><b>Expressions and Equations (Course of Study Grade 8)</b></p>				
<p>10. Analyze and solve pairs of simultaneous linear equations. [8-EE8]</p> <p>a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersections of their graphs because points of intersection satisfy both equations simultaneously. [8-EE8a]</p> <p>b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. [8-EE8b]</p> <p><b>Example:</b> <math>3x + 2y = 5</math> and <math>3x + 2y = 6</math> have no solution because <math>3x + 2y</math> cannot simultaneously be 5 and 6.</p> <p>c. Solve real-world and mathematical problems leading to two linear equations in two variables. [8-EE8c]</p> <p><b>Example:</b> Given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.</p>				
<p><b>Functions (Course of Study Grade 8)</b></p>				
<p>12. Compare properties of two functions, each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). [8-F2]</p> <p><b>Example:</b> Given a linear function represented by a table of values and linear function represented by an algebraic expression, determine which function has the greater rate of change.</p>				

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<p>14. Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two <math>(x,y)</math> values, including reading these from a table or from a graph. Interpret the rate of change and initial value of linear function in terms of the situation it models and in terms of its graph or a table of values. [8-F4]</p>				
<p>11. Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. (Function notation is not required in Grade 8.) [8-F1]</p>				
<p>13. Interpret the equation <math>y = mx + b</math> as defining a linear function whose graph is a straight line; give examples of functions that are not linear. [8-F3]</p> <p><b>Example:</b> The function <math>A = s^2</math> giving the area of a square as a function of its side length is not linear because its graph contains the points <math>(1,1)</math>, <math>(2,4)</math>, and <math>(3,9)</math>, which are not on a straight line.</p>				
<p>15. Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally. [8-F5]</p>				