



Decimals series

Adding & Subtracting Decimal Fractions

Primary - Secondary
Duration: 20 Minutes

Adding and subtracting decimal numbers can be accomplished using these five steps. Fill in any missing decimal points, line up the decimal points, fill in any missing zeros, bring the decimal point down for the answer, and perform the addition or subtraction. You can also compare two decimal numbers by lining up the decimal points and comparing place values moving to the right.

Changing Fractions to Decimals and Decimals to Fractions

Primary - Secondary
Duration: 13 Minutes

Changing back and forth between decimals and fractions is an important mathematical tool and is explained in detail in this video. When changing fractions into decimals, it is sometimes necessary to determine a level of accuracy so that the decimal can be rounded to a reasonable number of decimal places.

Dividing Decimal Fractions

Primary - Secondary
Duration: 23 Minutes

When dividing decimals, you will always want the divisor to be a whole number. If it is not, start by multiplying the divisor and the dividend by the same power of ten before doing the long division. You should also determine how accurate you want your answer to be. This will determine how far to carry out the process before rounding off. Finally, there is a shortcut that can be used when dividing by powers of ten.

Multiplying Decimals

Primary - Secondary
Duration: 19 Minutes

Multiplying decimal numbers is just like multiplying whole numbers. The only difference is that you must figure out where to put the decimal point in your answer. This video tells you how to figure out where to put the decimal point, and then demonstrates why the rule works. You will also learn a short-cut for multiplying by powers of ten.

Rounding Numbers

Primary - Secondary
Duration: 23 Minutes

Rounding is used when you really don't care what the exact amount of something is, or when it may be impossible to determine the exact amount. When rounding you are giving an approximate amount. This video shows the basic steps involved in rounding numbers to any given place value whether it is to the right or to the left of the decimal point.

Square Roots

Primary - Secondary
Duration: 18 Minutes

In this video you will learn the meaning of taking a square root, and also be introduced to some application problems involving areas of squares. For whole numbers that are not perfect squares, you will use a table of square root values to determine the square root. The product property for square roots will also be discussed.

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<p>Understanding Decimal Fractions</p> <p>Secondary Duration: 25 Minutes</p>	<p>Decimal numbers are introduced by first, writing them in expanded form. Place value is assigned using descending powers of ten as the digits move from left to the right. Reading and writing decimals is discussed, and the student is also shown how to convert a decimal number into fraction form.</p>
<p>Discovering Algebra with Graphing Calculators series</p>	
<p>Examining Probability</p> <p>Senior Primary - Junior Secondary Duration: 25 Minutes</p>	<p>Written and hosted by renowned mathematics instructor Monica Neagoy, this series leads students through graphing calculator functions for solving algebraic equations. Colourful graphics and animation enliven the presentations, and individuals in a wide range of careers demonstrate the crucial role of math in their everyday lives.</p> <p>This program demonstrates solving problems of probability. Students learn the use of the graphing calculator's random number generator to verify predictions. Probability factors significantly into weather forecasting and a meteorologist shows how math helps predict sunshine or showers.</p>
<p>Exploring Quadratics</p> <p>Senior Primary - Junior Secondary Duration: 28 Minutes</p>	<p>Written and hosted by renowned mathematics instructor Monica Neagoy, this series leads students through graphing calculator functions for solving algebraic equations. Colourful graphics and animation enliven the presentations, and individuals in a wide range of careers demonstrate the crucial role of math in their everyday lives.</p> <p>In this episode, students explore quadratic regression and properties for determining heights and roots. They also learn practical applications of the irrational number phi. A roller coaster designer reveals how quadratic function graphs, or parabolas, figure into the engineering of these thrill rides.</p>
<p>Finding the Slope of a Line</p> <p>Senior Primary - Junior Secondary Duration: 28 Minutes</p>	<p>Written and hosted by renowned mathematics instructor Monica Neagoy, this series leads students through graphing calculator functions for solving algebraic equations. Colourful graphics and animation enliven the presentations, and individuals in a wide range of careers demonstrate the crucial role of math in their everyday lives.</p> <p>In this episode, discover how slope measures change in linear relationships. Learn how to use the graphing calculator to find the slope using graphs, a selection of two points, or an equation. A pilot discusses the importance of slope in flying a plane.</p>
<p>Investigating Inequalities</p> <p>Senior Primary - Junior Secondary Duration: 30 Minutes</p>	<p>Written and hosted by renowned mathematics instructor Monica Neagoy, this series leads students through graphing calculator functions for solving algebraic equations. Colourful graphics and animation enliven the presentations, and individuals in a wide range of careers demonstrate the crucial role of math in their everyday lives.</p> <p>Investigate linear and nonlinear inequalities with one and two variables. Factor quantity and resource constraints to resolve linear programming problems. Learn how a toy manufacturer maintains product quality while maximising profit.</p>

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<p>Plotting the Curve of Best Fit</p> <p>Senior Primary - Junior Secondary Duration: 25 Minutes</p>	<p>Written and hosted by renowned mathematics instructor Monica Neagoy, this series leads students through graphing calculator functions for solving algebraic equations. Colourful graphics and animation enliven the presentations, and individuals in a wide range of careers demonstrate the crucial role of math in their everyday lives.</p> <p>This program examines plotting data to determine a curve (linear, quadratic, or exponential) of best fit. Students create scatter plots, interpret results, and make predictions based on table values. A university swim coach and team members relate how math factors into their training and results.</p>
<p>Representing and Analysing Data</p> <p>Senior Primary - Junior Secondary Duration: 25 Minutes</p>	<p>Written and hosted by renowned mathematics instructor Monica Neagoy, this series leads students through graphing calculator functions for solving algebraic equations. Colourful graphics and animation enliven the presentations, and individuals in a wide range of careers demonstrate the crucial role of math in their everyday lives.</p> <p>This program demonstrates representing and analysing data, making inferences, and drawing conclusions. Students learn to create line graphs, histograms, and other mathematical forms for data analysis. A volcanologist relates how data analysis helps determine the nature of volcanic eruptions.</p>
<p>Solving Systems of Equations</p> <p>Senior Primary - Junior Secondary Duration: 33 Minutes</p>	<p>Written and hosted by renowned mathematics instructor Monica Neagoy, this series leads students through graphing calculator functions for solving algebraic equations. Colourful graphics and animation enliven the presentations, and individuals in a wide range of careers demonstrate the crucial role of math in their everyday lives.</p> <p>Understand the functions for solving systems of linear and quadratic equations. Solve equations quickly and efficiently using matrices. A chef shows how mathematics keeps things cooking at his restaurant.</p>
<p>Discovering Math series</p>	
<p>Algebra</p> <p>Junior Primary Duration: 13 Minutes</p>	<p>From recognising patterns of repeating events to determining rules for extending patterns, introduce young students to basic properties of functions and algebra. All content is tied to national standards and benchmarks.</p>
<p>Algebra</p> <p>Senior Primary - Junior Secondary Duration: 109 Minutes</p>	<p>From using expressions to represent relationships to using variables in multiple ways to linear equations and functions to solving simple inequalities, this video introduces middle school students to more advanced properties of functions and algebra.</p>
<p>Algebra</p> <p>Middle Primary - Senior Primary Duration: 53 Minutes</p>	<p>From representing patterns in a variety of ways to understanding the concepts of variables and equal relationships, introduce elementary students to more advanced properties of functions and algebra. All content is tied to national standards and benchmarks.</p>

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<p>Arithmetic</p> <p>Senior Primary - Junior Secondary Duration: 101 Minutes</p>	<p>From operations with whole numbers, fractions, decimals, and integers to rational numbers and root extraction to order of operations, this video introduces middle school students to more advanced procedures for computation.</p>
<p>Arithmetic</p> <p>Middle Primary - Senior Primary Duration: 75 Minutes</p>	<p>From multiplying and dividing whole numbers to working with decimals and fractions, introduce elementary students to more advanced procedures for computation. All content is tied to national standards and benchmarks.</p>
<p>Concepts in Advanced Algebra</p> <p>Middle Secondary - Senior Secondary Duration: 56 Minutes</p>	<p>Discover the remarkable achievements of ancient Chinese mathematicians in the area of advanced algebra. Then fast forward to today to see how people rely on permutations and mathematical combinations to analyse the outcome of track and field events. And learn how to measure seismic activity on a logarithmic scale and how to encrypt and decode messages using matrices.</p>
<p>Concepts in Algebra</p> <p>Middle Secondary - Senior Secondary Duration: 56 Minutes</p>	<p>Arabic numerals and algebraic concepts entered the realm of Western mathematics centuries ago. Explore the many ways we use these numerals and concepts today. Learn how variable expressions can calculate distance traveled, how equations can model business scenarios, and how quadratic equations can predict the trajectories of fireworks.</p>
<p>Concepts in Algebra: Ratios and Proportions</p> <p>Middle Secondary - Senior Secondary Duration: 57 Minutes</p>	<p>How are ratios and proportions used to solve real world problems? This video features them in Renaissance design, calculating the orbit of the moon, estimating animal populations, understanding currency exchange rates, making distance-speed conversions, and creating special effects in films.</p>
<p>Concepts in Business Mathematics: Economics and Finance</p> <p>Middle Secondary - Senior Secondary Duration: 57 Minutes</p>	<p>This program shows how algebraic functions are used in business and finance to calculate and compare rates of simple and compound interest, to efficiently store products, and to track profit and loss in a business setting.</p>
<p>Concepts in Geometry</p> <p>Middle Secondary - Senior Secondary Duration: 56 Minutes</p>	<p>Math plays a role in the design, technology, and construction of modern skyscrapers: just as it did in ancient Greek architecture. See how triangles, quadrilaterals, circles, and polygons have helped shape structures found the world over.</p>

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<p>Concepts in Geometry and Measurement: Coordinate Geometry</p> <p>Middle Secondary - Senior Secondary Duration: 57 Minutes</p>	<p>This video shows how coordinate grid systems have been used throughout history for navigation, archaeology, and space exploration. Also included is a segment on how coordinate systems used by computers differ from the Cartesian system.</p>
<p>Concepts in Precalculus I: Trigonometry</p> <p>Middle Secondary - Senior Secondary Duration: 56 Minutes</p>	<p>The use of trigonometry to solve real world problems includes how math developed during the golden age of the Moors, how the law of cosines aids land surveying, aircraft navigation and the law of sines, exploring sine waves in music, and using the sine function to measure ocean wave activity, including tsunamis.</p>
<p>Concepts in Precalculus II: Limits, Infinity, and Probability</p> <p>Middle Secondary - Senior Secondary Duration: 56 Minutes</p>	<p>This video features math and the world view in the Indus Valley and includes applications of infinite series found in Zeno's Paradox, joint probability in sporting events, conditional probability and the effects of over-fishing, and limits and infinity in the context of astronomy.</p>
<p>Geometry</p> <p>Junior Primary Duration: 18 Minutes</p>	<p>From geometric shapes to spatial language to creating patterns, introduce young students to the basic properties and concepts of geometry. All content is tied to national standards and benchmarks.</p>
<p>Geometry</p> <p>Senior Primary - Junior Secondary Duration: 60 Minutes</p>	<p>From methods of geometric construction to three-dimensional figures to properties of triangles to representations and transformations, this video introduces middle school students to more advanced properties and concepts of geometry.</p>
<p>Geometry</p> <p>Middle Primary - Senior Primary Duration: 49 Minutes</p>	<p>From symmetry and three-dimensionality to congruent shapes and the use of scale, introduce elementary students to more advanced properties and concepts of geometry. All content is tied to national standards and benchmarks.</p>
<p>Geometry, Part 1</p> <p>Middle Secondary - Senior Secondary Duration: 65 Minutes</p>	<p>This program addresses the correspondence of algebra and geometry, the Pythagorean theorem, transformation, symmetry, vectors, and basic geometric constructions with a straight-edge and compass.</p>
<p>Geometry, Part 2</p> <p>Middle Secondary - Senior Secondary Duration: 55 Minutes</p>	<p>Aspects of geometry covered in this program include trigonometric ratios and concepts, polar coordinates, inductive and deductive reasoning in geometry, and geometric proofs.</p>

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<p>Graphing Calculators: Graphing a Line</p> <p>Middle Secondary - Senior Secondary Duration: 29 Minutes</p>	<p>This program details the various functions used to graph a line on the graphing calculator. As a math instructor shows step-by-step keystrokes for a number of graphing functions, students work singly and in groups and share their observations. Colourful graphics further detail the process. The practical applications for graphing a line are also shown in various real-life situations.</p>
<p>Measurement</p> <p>Junior Primary Duration: 35 Minutes</p>	<p>From linear measurements to the telling time to counting money, introduce young students to the basic properties and concepts of measurement. All content is tied to national standards and benchmarks.</p>
<p>Measurement</p> <p>Senior Primary - Junior Secondary Duration: 72 Minutes</p>	<p>From the concept of rate to linear dimensions and circumference to conversion of units of measurement, this video introduces middle school students to more advanced concepts of measurement.</p>
<p>Measurement</p> <p>Middle Primary - Senior Primary Duration: 55 Minutes</p>	<p>From miles per gallon and metric conversion to circumference and volume, introduce elementary students to more-advanced properties and concepts of measurement. All content is tied to national standards and benchmarks.</p>
<p>Number Theory</p> <p>Junior Primary Duration: 29 Minutes</p>	<p>From written numerals to equal parts to cardinal and ordinal numbers, introduce young students to the basic properties and concepts of numbers. All content is tied to national standards and benchmarks.</p>
<p>Number Theory</p> <p>Senior Primary - Junior Secondary Duration: 66 Minutes</p>	<p>Numbers can be expressed in many ways. Learn about rational numbers and integers, percentages, and scientific notation, and explore ancient and modern numerical systems such as Roman numerals and binary numbers.</p>
<p>Number Theory</p> <p>Middle Primary - Senior Primary Duration: 56 Minutes</p>	<p>From counting cardinal and ordinal numbers to basic whole number relationships to the subdivision into equal parts, introduce elementary students to more advanced properties and concepts of numbers. All content is tied to national standards and benchmarks.</p>
<p>Probability</p> <p>Junior Primary Duration: 13 Minutes</p>	<p>From likelihood to frequency to prediction, introduce young students to the basic concepts of probability. All content is tied to national standards and benchmarks.</p>

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<p>Probability</p> <p>Senior Primary - Junior Secondary Duration: 50 Minutes</p>	<p>From genetics to baseball to tossing coins, probability is everywhere. Learn to calculate probabilities both empirically and theoretically, and see examples of how probability is applied to solve problems.</p>
<p>Probability</p> <p>Middle Primary - Senior Primary Duration: 35 Minutes</p>	<p>From the concept of chance to statistical predictions to basic sample spaces, introduce elementary students to more advanced concepts of probability. All content is tied to national standards and benchmarks.</p>
<p>Problem Solving</p> <p>Junior Primary Duration: 31 Minutes</p>	<p>From representative pictures to organised lists to whole number models, introduce young students to basic strategies for solving problems.</p>
<p>Problem Solving</p> <p>Senior Primary - Junior Secondary Duration: 72 Minutes</p>	<p>From determining pertinent information to trying and comparing multiple strategies, this video uses practical examples of logic and reasoning to illustrate how mathematics is used to solve real world problems.</p>
<p>Problem Solving</p> <p>Middle Primary - Senior Primary Duration: 44 Minutes</p>	<p>From diagrams to trial and error to valid and invalid arguments, introduce elementary students to more advanced strategies for solving problems. All content is tied to national standards and benchmarks.</p>
<p>Problem Solving</p> <p>Middle Secondary - Senior Secondary Duration: 85 Minutes</p>	<p>Aspects of problem solving addressed in this program include representation of quantities and patterns, mathematical modeling, algorithms, language and symbolism, and logic and proof.</p>
<p>Rational Number Concepts</p> <p>Middle Secondary - Senior Secondary Duration: 56 Minutes</p>	<p>Discover how the Egyptians relied on math and the fine relationship between math and music. And explore the Fibonacci sequence found in nature, the long history of pi, and what it takes to convert Fahrenheit to Celsius.</p>
<p>Statistics and Data Analysis</p> <p>Junior Primary Duration: 14 Minutes</p>	<p>From simple graphs to sampling to determining what is common to a group, introduce young students to the basic concepts of statistics and data analysis. All content is tied to national standards and benchmarks.</p>

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<p>Statistics and Data Analysis</p> <p>Senior Primary - Junior Secondary Duration: 86 Minutes</p>	<p>From measuring central tendency to frequency and distribution using statistical measures for a variety of purposes to sample selection methods, this video introduces middle school students to more advanced concepts of statistics and data analysis.</p>
<p>Statistics and Data Analysis</p> <p>Middle Primary - Senior Primary Duration: 59 Minutes</p>	<p>From data points and determining spread to creating and reading graphs and charts, introduce elementary students to more advanced concepts of statistics and data analysis. All content is tied to national standards and benchmarks.</p>
<p>Statistics and Data Analysis: Part 2</p> <p>Middle Secondary - Senior Secondary Duration: 57 Minutes</p>	<p>This program includes consideration of outliers in data sets, other aspects of data interpretation, sampling considerations and techniques, and error and uncertainty in statistical inference.</p>
<p>Statistics and Data Analysis; Part 1</p> <p>Middle Secondary - Senior Secondary Duration: 46 Minutes</p>	<p>This program includes consideration of methods of displaying data, measures of central tendency and variability, correlation, and line-fitting methods.</p>
<p>The Nature and Use of Mathematics</p> <p>Junior Primary Duration: 17 Minutes</p>	<p>By reviewing the many ways we use numbers in our daily lives, introduce young students to basic concepts about the general nature and uses of mathematics. All content is tied to national standards and benchmarks.</p>
<p>The Nature and Use of Mathematics</p> <p>Senior Primary - Junior Secondary Duration: 33 Minutes</p>	<p>From the uses of mathematics throughout history to solve problems to representation of abstract ideas through mathematical representation, this video introduces middle school students to more advanced concepts about the general nature and uses of mathematics.</p>
<p>The Nature and Use of Mathematics</p> <p>Middle Primary - Senior Primary Duration: 27 Minutes</p>	<p>From medicine to engineering, math has many real world applications. Learn about them, and techniques for representing mathematical ideas.</p>

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Math and Culture series

The Age of Exploration Middle Secondary - Senior Secondary Duration: 30 Minutes	Travel back in time to the Age of Exploration to discover how new mathematical concepts aided travel.
The Arabs Middle Secondary - Senior Secondary Duration: 31 Minutes	Discover how Islamic civilisation laid the foundations of algebra and implemented the number and decimal place-value systems we still use today. Students will also learn about al-Khwarizmi, whose treatise on algebra became one of the most influential works of mathematics.
The Egyptians Middle Secondary - Senior Secondary Duration: 29 Minutes	Explore the ancient Egyptian number system, their process of doubling and addition to multiply and divide, expressing fractions in terms of unit fractions, and how a modern-day algorithm relates to Egyptian fractions.
The Greeks Middle Secondary - Senior Secondary Duration: 27 Minutes	See how the Greeks used deductive reasoning to develop an elaborate mathematical system that's still in use. Students will learn about the contributions of Plato, Aristotle, Pythagoras, Thales, and Euclid.
The Indus Valley Middle Secondary - Senior Secondary Duration: 30 Minutes	Visit the Indus Valley to learn how this innovative culture brought us our decimal number system, sophisticated probability concepts, and dazzling explorations of infinitely large numbers.
The Maya Middle Secondary - Senior Secondary Duration: 32 Minutes	The many achievements of the ancient Maya included a number system as sophisticated as our own. This base 20 system also included a value for zero, a remarkable mathematical achievement that occurred independently of Europe.
The Moors of Spain Middle Secondary - Senior Secondary Duration: 24 Minutes	See how the Moors' use of spherical trigonometry to pinpoint Mecca laid the foundation for the advanced mathematics used today.
The Renaissance Middle Secondary - Senior Secondary Duration: 29 Minutes	Discover how the mathematical achievements of the Renaissance were as impressive as those in science, art, and philosophy.

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Math Factor series

<p>Alternate Locus Definitions: Ellipse and Circle</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>Using string and tacks, students redefine the circle and ellipse using the concept of locus. Using these locus definitions, students learn how to find the equation of a conic, use double concentric graph paper, and solve problems that require an understanding of the concept of locus. A whispering gallery shows the relationship between the foci and the focal radii of an ellipse.</p>
<p>Applications and Problem Solving</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>An interview with a landscape designer leads to a discussion of the problem solving process. Strategies such as using mind maps show students how to approach problem solving. Students are taught to derive equations of integral polynomial functions when given zeros, a point and a zero, or the zeroes and any other information that uniquely defines the function.</p>
<p>Applications of Circular Functions</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>Students learn how to solve trigonometric equations of primary or reciprocal functions either algebraically or graphically.</p>
<p>Applications of Standard Normal Distribution</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>How tall is tall? How fit is fit? Sets of data from a variety of situations are used to show why we need a standard normal curve and how and where it is used. Z-scores are supplied to solve problems involving probability distributions.</p>
<p>Arithmetic</p> <p>Junior Primary Duration: 24 Minutes</p>	<p>From the concepts of adding and subtracting to strategies for estimation, introduce young students to the basic procedures of computation. All content is tied to national standards and benchmarks.</p>
<p>Arithmetic Sequences</p> <p>Middle Secondary - Senior Secondary Duration: Math Factor 30 Minutes</p>	<p>Arithmetic sequences are presented by the use of many pictorial and numerical arithmetic sequences. Emphasis is placed on understanding the patterns in various sequences and the general term formula is manipulated to solve for a, n, t_n and d. A system of equations is used to solve an arithmetic means problem. North American AM radio stations and the pattern of Halley's comet sightings are discussed as examples of arithmetic sequences.</p>
<p>Binomial Theorem</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>Expansions of powers of a binomial are examined from the point of view of patterns, including the link between the coefficients and Pascal's Triangle. Binomial expressions are then expanded using the Binomial Theorem. Specific terms in binomial expansions are calculated by the method of determining the general term.</p>

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<p>Binomial Theorem (Pascal's Triangle)</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>The connection between Pascal's Triangle and binomial distribution is made using a model. Pascal's Triangle is used to carry out binomial expansion and solve problems.</p>
<p>Building Trigonometric Models: Graphing Trigonometric Functions</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>Models help students understand mathematical concepts as they occur in the natural world. In this program trigonometry is used to model applications involving music, electricity and the Ferris wheel.</p>
<p>Characteristics of Normal Distribution</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>In this video, characteristics of normal distribution are applied to a variety of problems involving data that is normally distributed. Sample problems involve topics such as the mean length of Walleye fish and hockey games.</p>
<p>Combinations</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>Choices pervade our lives. From concrete examples to questions with restrictions, students count choices and solve problems involving combinations. Practical and technological examples are included.</p>
<p>Combined Transformations of Trigonometric Functions</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>Demonstrates different methods of graphing transformations of trigonometric functions.</p>
<p>Derivation and Use of Trigonometric Identities</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>Galileo's accomplishments thread their way through this program as viewers learn how to present basic proofs and verify identifies. Highlights Pythagorean, reciprocal and quotient identities and students and teachers presenting proofs. Fermat's Last Theorem is briefly discussed as one example of a longstanding mathematical puzzle.</p>
<p>Describing Real World Phenomena Using Logarithms</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>Using Logarithms Decibels, the Richter Scale, pH levels and the slide rule are applications of logarithms examined via experiments, interviews and problem solving.</p>

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<p>Development of Circular Functions</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>This program reviews previously learned vocabulary and concepts of the primary trigonometric ratios, degree/radian relationship and development and application of special, quadrantal, reference and coterminal angles. Clocks, special angle models, a pace telescope and an interview with a physicist bring home the significance of circular functions.</p>
<p>Division of Polynomial Functions</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>Historical anecdotes intersperse the teaching of long division with linear and nonlinear divisors. The concept of synthetic division is also presented, along with a strategy for finding missing coefficients.</p>
<p>Exponential and Logarithmic Functions Review and Problem Solving</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>Reviews expressions, equations and graphs related to exponential and logarithmic functions. Graphs are presented as inverses, both in base 10 and base e. Demonstrates applications using world population (exponential growth) and the furnace filter (exponential decay). The laws of logarithms and the interchangeability of exponential and logarithmic forms are emphasised.</p>
<p>Exponential Growth and Decay</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>Through a variety of real world applications, this program explores the concepts of exponential growth and decay. Examples include carbon dating, bacterial growth, DNA splicing, and the effect of the bubonic plague on current world population.</p>
<p>Factoring and Graphing Polynomial Functions</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>Prior knowledge of factoring, the Remainder and Factor Theorems, the division algorithm and the graphs of functions are all brought together in this program. The concept of multiplicity is modeled in a unique way and its effects are shown with graphics.</p>
<p>Fundamental Counting Principle and Permutations</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>Finally - ice cream and mathematics! Stereos, clothing, shopping, blood types, batting orders, telephone numbers and postal codes are some of the topics used to demonstrate the Fundamental Counting Principle. Students are introduced to permutations in a very general way.</p>
<p>General Quadratic Relation: An Introduction</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>This program discusses the difference between a relation and a function, and focuses on developing the general quadratic relation and the conic sections that it defines. Viewers examine the effects of changing A, C and F, where B=0 and changing D and E on a given A, C and F, where B=0 on the quadratic relation. Applications which relate the movement of bodies in space to the general quadratic relation and various conic sections are also in this program.</p>

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<p>General Quadratic Relation: Circles and Ellipses</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>Physical characteristics of the circle and ellipse are identified and related to the parameters of the general quadratic relation. The connection between A and C and the effect of changing D, E, and F are determined. Applications using the ellipse range from bicycles to da Vinci.</p>
<p>General Quadratic Relation: Parabolas and Hyperbolas</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>This video provides an understanding of the general quadratic relation with respect to parabolas and hyperbolas. Connections are made between the double napped cone and the general quadratic relation and the degenerates of the parabola and hyperbola. The structure of an owl's face, antennae, and telescopes are discussed to reinforce the concepts.</p>
<p>Geometric Sequences</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>Students learn to identify what makes a sequence geometric and, using the principles behind its definition, derive its general term. Examples of geometric sequences found in music are explored.</p>
<p>Geometric Series</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>Viewers examine the information explosion, animal population and aspects of the Orb spider web as examples of geometric series. Students learn the general term formula for geometric series and are shown how to manipulate the formula to solve a variety of problems.</p>
<p>Graphing Trigonometric Functions</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>Heartbeats, bendable wire and oscilloscopes demonstrate some uses of trigonometric functions. Students explore the relationship between radians and degrees and are taught how to graph primary and reciprocal functions. Emphasis is placed on the importance of understanding and analysis of the function's properties including domain, range, period, y-intercepts and intercepts.</p>
<p>Identification, Connections, and Applications of Quadratic Relations</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>What does eccentricity, the double napped cone, the general quadratic relation and the locus definitions for conics have in common? Students are shown how to identify the type of conic given a description based on any of the four forms, connect the various conics to their definitions and solve a variety of problems which can be represented by quadratic relations.</p>
<p>Introduction to Polynomial Functions and Their Graphs</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>Water fountains and speeding cars are used to introduce polynomial functions, the basic terminology, the classification and properties of polynomial functions (domain, range, x- and y-intercepts), as well as rudimentary graphing techniques.</p>

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<p>Introduction to Sequences</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>Students learn to identify finite and infinite sequences, write the terms of a sequence given a function that describes it, and determine functions that describe simple sequences. An observation of the Fibonacci sequence in nature will prove fascinating to those with green and black thumbs alike.</p>
<p>Inverse of the Exponential Function: The Logarithmic Function</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>Examines inverses, logarithms and their graphs in detail and introduces viewers to the formal definition of logarithms and the characteristics of their graphs. Also includes rewriting logarithmic expressions in exponential form and vice versa and a discussion of the properties of logarithms.</p>
<p>Laws of Logarithms: Evaluating Logarithmic Expressions</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>A review of the exponent laws is used to establish and prove the laws of logarithms. Students learn how to simplify and evaluate logarithmic expressions using the laws. Log and semi-log graph paper is demonstrated.</p>
<p>Locus and Eccentricity of the Hyperbola</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>This program investigates several approaches used to study the hyperbola's shape; locus involving two fixed points, double concentric circles, the focus-directrix (eccentricity) definition, and computer graphing programs. Equations of hyperbolas are derived and sketched using these approaches. Real life applications are developed in the fields of navigation and astronomy.</p>
<p>Locus and Eccentricity of the Parabola</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>Presents several approaches that can be used to investigate the shape of the parabola. Locus and eccentricity are explained and then used to solve problems that involve determining and analysing equations of various parabolas. Paper folding, circleline paper, and computer graphing programs are used to generate parabolic logic.</p>
<p>Logarithmic and Exponential Equations</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>This program describes how to solve and verify exponential equations and logarithmic equations, both base 10 and non-base 10. Includes a brief discussion of how to change a base and how to deal with restrictions. Presents historical facts about calculating devices such as abacus and Napier's Bones. An interview with an accountant shows doubling time and investments as applications of logarithmic and exponential equations.</p>
<p>Normal Distribution</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>This program shows some of the ways in which statistics play a role in today's society. The measures of central tendency - mean, median, and mode - are reviewed and standard deviation is introduced as a measure of dispersion.</p>

Math

<p>Permutations and Combinations Review</p> <p>Secondary Duration: 29 Minutes</p>	<p>Choosing a wardrobe, using a combination lock, and the Braille alphabet are some applications of the use of the fundamental counting principle, permutations and combinations. Here you will review your understanding of these topics, and also Pascal's Triangle and the Binomial Theorem. Knowing when to use combinations vs. permutations is essential.</p>
<p>Permutations with Restrictions</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>Saddling up horses for a trail ride introduces permutations with restrictions. Formulas and common sense approaches are used to solve permutation problems, including circular and ring permutations. In one real life application, a computer checkers champion explains that permutation theory and practice are "at the heart" of the computer programs he writes.</p>
<p>Physical Properties of Conic Sections</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>Explores the topology of the double napped cone and, through computer technology and graphics, demonstrates conditions necessary to produce the conic sections and their degenerates.</p>
<p>Polynomial Review</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>This program reviews concepts relating to polynomial functions. Topics include the Factor and Remainder Theorems, division of polynomials, graphing and writing the equation of polynomial function.</p>
<p>Probability</p> <p>Junior Primary Duration: 30 Minutes</p>	<p>It's an uncertain world we live in and much of our lives depends on probability or chance. This program reviews the basics of probability and shows how permutations can be used to solve probability problems in which order plays a role. New technology in the field of DNA fingerprinting is just one of the applications featured.</p>
<p>Probability: Combinatorics</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>The probability of games such as cards and Matho demonstrates the application of combinatorics to probability problems. The program also deals with questions involving complementary probabilities, the phrases "at least" and "at most", and shows how some questions can be interpreted in more than one way.</p>
<p>Quadratic Relations Review</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>This program provides a general overview of quadratic relations. Each conic is studied individually in terms of it 's locus and eccentricity definition, identifying characteristics of the general form of the equation, and through examples of the questions that can be solved with this information. Also included is the application of conics to the fields of optics and sound.</p>
<p>Radian Measurement</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>The discovery approach is used to examine an angle of one radian. The concept of radian measurement is introduced and viewers learn how to convert from radians to degrees and vice versa. Applications of radian measurement to arch length and angular velocity are explained.</p>

Math

<p>Sequences and Series Review</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>This review of arithmetic and geometric sequences and series uses several common sense approaches and formula manipulation to work with the patterns and relationships in a string of numbers. The geometric sequence representing the f-stops found on a camera lens housing demonstrates the use of recursive definitions. An investment problem is solved using two different methods: sequences and exponential growth.</p>
<p>Sequences: Recursive Forms</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>This video addresses how to write the terms of a sequence, given its recursive definition, and the converse - how to define a sequence recursively, given its terms. A real life application shows how a computer program performs the calculations indicated by a recursive definition. A second application investigates the recurring mathematical pattern that is the identifying characteristic on international paper sizes.</p>
<p>Sigma Notation</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>“Why is sigma notation useful?” and “Where is it actually used?” are questions answered in this program. Shows how calculators use sigma notation to determine trigonometric ratios and examines the various patterns present in Pascal’s Triangle.</p>
<p>Sketching and Graphing Exponential Functions</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>Students learn to recognise the general characteristics of the graphs of exponential functions with various bases. Situations involving exponential growth and decay are explored. Students solve and verify exponential equations.</p>
<p>Statistics Review</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>The life expectancy of consumer products is the theme running through this review of basic statistics and the normal curve. Students and teachers identify the main characteristics and the properties of the normal curve. Standard normal distribution, z-score, and probability problems are then investigated. Tables, calculators and computer graphing programs are used to calculate the proportions of the area contained under different sections of the normal curve.</p>
<p>Sum and Difference Identities</p> <p>Duration: 29 Minutes</p>	<p>A number of methods are used to verify the sum and difference identities. The negative and complementary arc identities are proven, exact values calculated, double-angle identities are derived, and equations are solved all using the sum and difference identities.</p>
<p>The Remainder and Factor Theorems</p> <p>Secondary Duration: 30 Minutes</p>	<p>A review of the exponent laws is used to establish and prove the laws of logarithms. Students learn how to simplify and evaluate logarithmic expressions using the laws. Log and semi-log graph paper is demonstrated.</p>
<p>Trigonometric and Circular Functions Review</p> <p>Middle Secondary - Senior Secondary Duration: 30 Minutes</p>	<p>Topics receiving special attention include radian measure, transformation of trigonometric functions, solving trigonometric equations, and proving identities. Trigonometry is used as a model to show that hours of daylight and the times of sunrise and sunset vary with time of the year.</p>

Math

Trigonometric Transformations: Investigating a, b, c, and d

Secondary

Duration: 29 Minutes

Many real-world phenomena can be modelled using trigonometric equations like $y = \sin(x)$ or $y = \cos(x)$. However, in most situations the models are not that simple. Knowledge of the transformations of these simple equations and their respective graphs will allow us to determine equations for many more scientific phenomena. Here you will see how changes in amplitude, period, phase shift, and vertical displacement affect the equations we use.