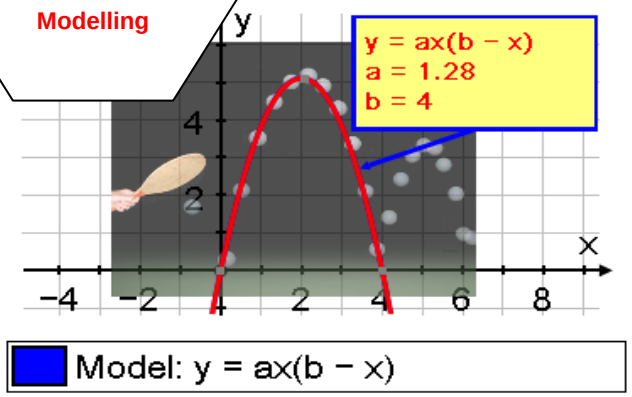
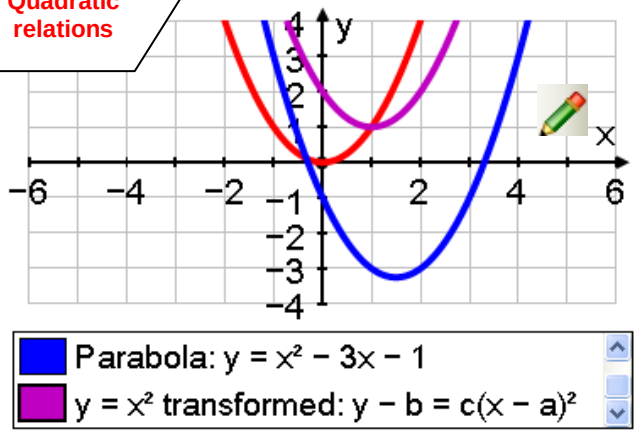
Autograph version 3 and Grade 10 Outcomes

Autograph is spectacular dynamic software from the UK that allows teachers to visualise many of the mathematical topics in the Ontario Grade 10 OUTCOMES

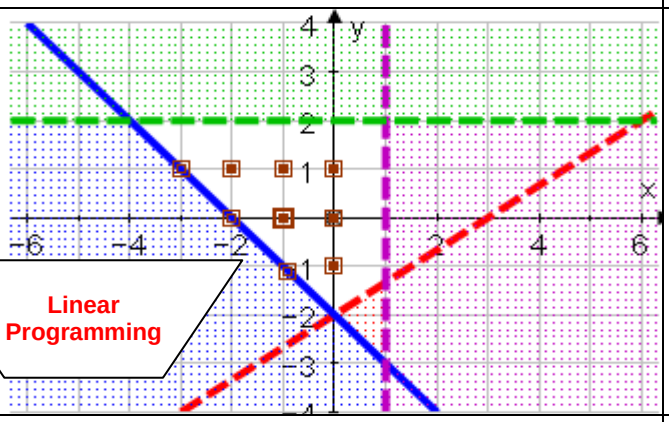
Modelling



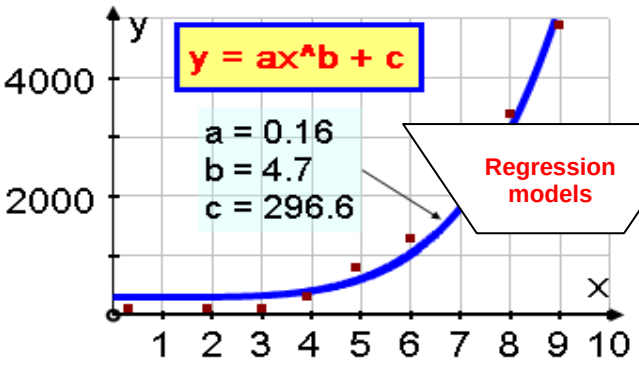
Quadratic relations



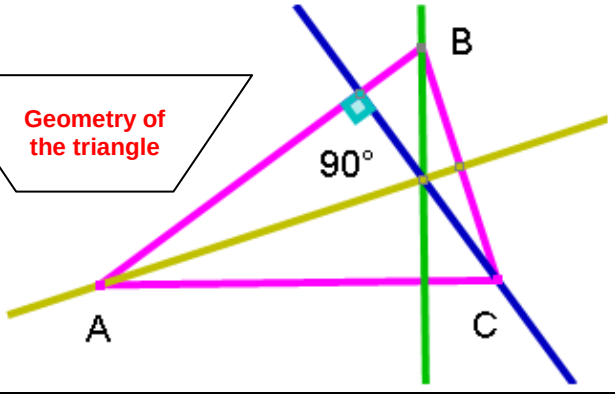
Linear Programming



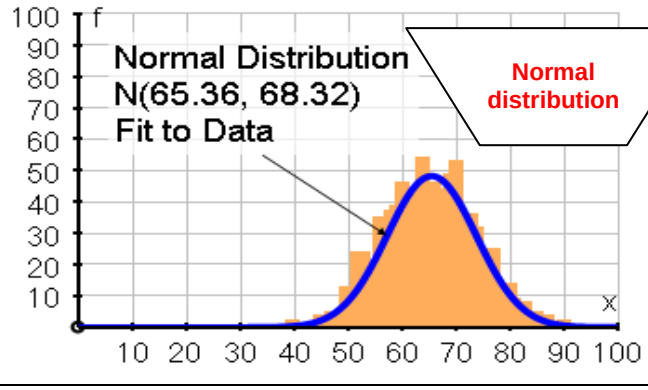
Regression models



Geometry of the triangle



Normal distribution



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Ministry of Education The Ontario Mathematics Curriculum

MATHEMATICS 10 OUTCOMES
Grade 10

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GCO A Students will be expected to demonstrate number sense and apply number theory concepts

A1 relate sets of numbers to solutions of inequalities
A2 analyse graphs or charts of situations to derive specific information
A3 demonstrate an understanding of the role of irrational numbers in applications
A4 approximate square roots
A5 demonstrate an understanding of the zero product property and its relationship to solving equations by factoring
A6 apply properties of numbers when operating upon expressions and equations
A7 demonstrate and apply an understanding of discrete and continuous number systems
A8 demonstrate an understanding of and apply properties to operations involving square roots

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GCO B Students will be expected to demonstrate operation sense and apply operation principles and procedures in both numeric and algebraic situations

B1 model (with concrete materials and pictorial representations) and express the relationships between arithmetic operations and operations on algebraic expressions and equations
B2 develop algorithms and perform operations on irrational numbers
B3 use concrete materials, pictorials representation, and algebraic symbolism to perform operations on polynomials
B4 identify and calculate the maximum and/or minimum values in a linear programming model
B5 develop, analyse, and apply procedures for matrix multiplication
B6 solve network problems using matrices

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MATHEMATICS 10 OUTCOMES ==========	AUTOGRAPH PAGE ==========
GCO C Students will be expected to explore, recognize, represent, and apply patterns and relationships, both formally and informally	
C1 express problems in terms of equations and vice versa	
C2 model real-world phenomena with linear, quadratic, exponential and power equations, and linear inequalities	2D
C3 gather data, plot the data using appropriate scales, and demonstrating an understanding of independent and dependent variables, and domain and range	STATISTICS
C4 create and analyse plots using appropriate technology	
C5 sketch graphs from words, tables, and collected data	
C6 apply linear programming to find optimal solutions to real world problems	2D
C7 model real-world situations with networks and matrices	
C8 identify, generalize, and apply patterns	
C9 construct and analyse graphs and tables relating two variables	
C10 describe real-world relationships depicted by graphs, tables of values, and written descriptions	
C11 write an inequality to describe its graph	
C12 express and interpret constraints using inequalities	2D
C13 determine the slope and y-intercept of a line from a table of values or a graph	
C14 determine the equation of a line using the slope and y-intercept	2D
C15 develop and apply strategies for solving problems	
C16 interpret solutions to equations based on context	
C17 solve problems using graphing technology	2D
C18 investigate and find the solution to a problem by graphing two linear equations with and without technology	
C19 solve systems of linear equations using substitution and graphing methods	2D
C20 evaluate and interpret non-linear equations using graphing technology	
C21 explore and apply functional relationships and notation, both formally and informally	2D
C22 analyse and describe transformations of quadratic functions and apply them to absolute value functions	
C23 express transformations algebraically and with mapping rules	
C24 rearrange equations	
C25 solve equations using graphs	
C26 solve quadratic equations by factoring	2D
C27 solve linear and simple radical, exponential, and absolute value equations and linear inequalities	
C28 explore and describe the dynamics of change depicted in tables and graphs	2D
C29 investigate, and make and test conjectures concerning the steepness and direction of a line	2D

MATHEMATICS 10 OUTCOMES

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C30 compare regression models of linear and non-linear functions
C31 graph equations and inequalities and analyse graphs both with and without graphing technology
C32 determine if a graph is linear by plotting points in a given situation
C33 graph by constructing a table of values, by using graphing technology, and when appropriate, by the slope y-intercept method
C34 investigate and make and test conjectures about the solution to equations and inequalities using graphing technology
C35 expand and factor polynomial expressions using perimeter and area models
C36 explore, determine, and apply relationships between perimeter and area, surface area, and volume
C37 represent network problems using matrices and vice versa

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GCO D: Students will be expected to demonstrate an understanding of and apply concepts and skills associated with measurement

D1 determine and apply formulas for perimeter, area, surface area, and volume
D2 apply the properties of similar triangles
D3 relate the trigonometric functions to the ratios in similar right triangles
D4 use calculators to find trigonometric values of angles and angles when trigonometric values are known
D5 apply trigonometric functions to solve problems involving right triangles, including the use of angles of elevation
D6 solve problems involving measurement using bearings and vectors
D7 determine the accuracy and precision of a measurement
D8 solve problems involving similar triangles and right triangles
D9 determine whether differences in repeated measurements are significant or accidental
D10 determine and apply relationships between the perimeters and areas of similar figures, and between the surface areas and volumes of similar solids
D11 explore, discover, and apply properties of maximum area and volume
D12 solve problems using trigonometric ratios
D13 demonstrate an understanding of the concepts of surface area and volume
D14 apply the Pythagorean Theorem

AUTOGRAPH PAGE

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2D

2D

2D

MATHEMATICS 10 OUTCOMES ==========	AUTOGRAPH PAGE ==========
GCO E: Students will be expected to demonstrate spatial sense and apply geometric concepts, properties, and relationships	
E1 make and test conjectures about 2D and 3D figures	
E2 solve problems involving polygons and polyhedra	
E3 construct and apply altitudes, medians, angle bisectors, and perpendicular bisectors to examine their intersection points	 2D
E4 apply transformations when solving problems	
E5 use transformations to draw graphs	 2D
E6 represent network problems as digraphs	
E7 understand/write a proof for Pythagoras Theorem	
E8 use inductive and deductive reasoning when observing patterns, developing properties and making conjectures	
E9 use deductive reasoning and construct logical arguments and be able to determine, when given a logical argument, if it is valid	
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GCO F: Students will be expected to solve problems involving the collection, display, and analysis of data	
F1 conduct experiments using statistical methods and scientific inquiry	
F2 the concerns and issues that pertain to the collection of data	
F3 construct various displays of data	 STATISTICS
F4 calculate various statistics using appropriate technology, analyse and interpret the displays, and describe the relationships	
F5 analyse statistical summaries, draw conclusions, and communicate results about distributions of data	
F6 solve problems by modelling real-world phenomena	 2D
F7 explore non-linear data using power and exponential regression to find a curve of best fit	
F8 determine and apply the line of best fit using the least squares method and median-median method and describe the differences	 2D
F9 demonstrate an intuitive understanding of correlation	
F10 extrapolation and equations to predict and solve problems	 2D
F11 real-world relationships depicted by graphs and tables of values	
F12 explore measurement issues using the normal curve	
F13 calculate and apply mean and standard deviation using technology to determine if a variation makes a difference	 STATISTICS
F14 interpret frequency bar graphs while conducting experiments	

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