

#### ALGEBRA 1 AT-A-GLANCE

### **ALGEBRA 1**

Algebra 1 builds on Grade 8 Math and prepares students for further study in Geometry and Algebra 2. The course focuses on foundational ideas such as proportional reasoning, equivalent forms of expressions or numbers (including integers and exponents), linearity and rate of change (represented and connected in situations, tables, graphs and equations) and operational

**Performance Measures:** 

Classwork: 0-20% of grade

Homework: 5-10% of grade

Assessments: 70-85% of grade

reasoning (as they evaluate or simplify expressions, or solve equations.) Students will also find absolute value, solve and graph linear inequalities and solve systems of equations and identify key aspects of the graphs of quadratic functions.

The College Prep and Honors levels look more deeply at quadratic functions as well as introduce students to other non-linear functions.

Intear functions		ar functions.					
	Algebra 1 Level 2	Algebra 1 College Prep	Algebra 1 Honors				
Algebra 1	Write linear equations in slope-	Write linear equations in multiple	Translate between multiple forms				
Builds on and	intercept form	forms	of linear equations				
Extends Prior	Solving equations by examining	Write and solve systems and	Create systems that yield specific				
Knowledge	systems graphically and	interpret the solutions in context.	solutions including infinite and no				
of	algebraically. Write and graph linear	Write and graph linear inequalities	solution. Represent real world				
	inequalities in one or two variables	in one or two variables given in	situations with inequalities				
		varied forms.					
	Operations to use the distributive	Investigate common patterns in	Simplifying multi-term				
	property to simplify an expression	polynomial multiplication	polynomials (i.e. a binomial times				
			a trinomial)				
	Graphing to include linear	Identify the characteristics of a	Graphing absolute value and				
	inequalities and quadratics	parabola	square root functions				
	Solving to include quadratic	Solve compound and absolute	Solve by completing the square				
	equations and linear inequalities.	value inequalities	and factor by grouping				
	Factor polynomials using quadratic						
	formulas and square roots						
	Exponents to model exponential	Analyze graphs or tables to	Use exponential functions to				
	growth and decay	determine the equation of an	model real-world growth and				
		exponential function	decay and analyze their				
			characteristics				
Expectations	Students will be able to apply a	Students will be able to apply a	Students will be able to apply a				
	range of mathematical procedures	wide range of mathematical	wider range of mathematical				
	accurately and efficiently.	procedures (often with the aim of	procedures (to manipulate				
	Students are given prompts and	manipulating numbers and	numbers and equations into				
	reviews, whenever necessary,	equations into equivalent forms)	equivalent forms) with a high				
	to help them recall relevant	accurately and efficiently.	degree of accuracy and efficiency.				
	concepts and procedures, such	Students are expected to be	Students are expected to be able				
	as proportional reasoning and	able to recall relevant	to recall relevant concepts and				
	solving single-variable linear	concepts and procedures,	procedures, such as proportional				
	equations. Students are then	such as proportional reasoning	reasoning and solving single-				
	expected to be able to apply	and solving single-variable	variable linear equations with little				
	those concepts and procedures	linear equations with some	to no prompting. Students are				
	towards the creation of new	prompting and review, if	then expected to be able to apply				
	knowledge.	necessary. Students are then	those concepts and procedures				
		expected to be able to apply	towards the creation of new				
		those concepts and	knowledge.				
		procedures towards the	_				
		creation of new knowledge.					

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Course Goals	Students will to be able to explain	Students will be able to explain	Students will be able to explain
	their reasoning verbally when	their reasoning quantitatively	their reasoning abstractly when
	applying most mathematical	when applying most mathematical	applying all mathematical
	procedures and be able to construct	procedures and construct viable	procedures and be able to
	viable arguments to justify a	arguments to justify a solution	construct and critique viable
	solution method.	method.	arguments to justify a solution
	Students will to work towards being	Students will be able to	method.
	able to independently make sense	independently make sense out of	Students will be able to
	out of problems and devise entry	problems and persevere towards	independently make sense out of
	point strategies for solving them.	solutions.	problems and look for and make
			use of structure.
Course	Algebra Level 2 focuses on rate of	Algebra College Prep includes a	Algebra Honors extends the
Content	change. Algebraic activities include	wider exploration of functions with	learning to include more complex
	representational and	respect to their graphs.	functions and how they can be
	transformational tasks, as well as	Additionally students will be	transformed. Furthermore,
	generalizing and justifying activities.	analyzing solutions to equations in	students will model functions and
	Throughout the course, concepts	context.	look for patterns when
	and skills are initially presented		manipulating expressions and
	through real and familiar situations,		solving equations.
	followed by activities that enable		
	students to determine, develop and		
	articulate structural distinctions		



#### GEOMETRY AT-A-GLANCE

### **GEOMETRY**

Geometry builds on Algebra 1 and Grade 8 Math to prepare students for further study in Algebra 2. The course is designed to enable students to develop the logical reasoning that is the foundation of mathematical proof. A primary goal of this Geometry curriculum is for students to develop Geometric Habits of Mind. These habits include: reasoning with relationships, generalizing geometric ideas,

**Performance Measures:** 

Classwork: 0-20% of grade

Homework: 5-10% of grade

Assessments: 70-85% of grade

investigating invariants and balancing exploration and reflection. Students will make conjectures based on investigations using geometric constructions, diagrams, and geometric properties and relationships and use some form of proof to verify or refute conjectures. Students will have legitimate opportunities to experiment, hypothesize, measure, analyze, test, talk, write, explain, and justify their ideas, engaging in real mathematics. Geometry tools (compass, protractor and ruler) will be integral to the course.

The College Prep, Honors and Advanced levels will conduct more thorough proofs and have rising expectations of the level to which students independently derive formulas and identify relationships.

	Geometry Level 2	Geometry College Prep	Geometry Honors	Geometry Advanced
Geometry	Geometric terms to	Write deductive	Write conjectures and	Create arguments that
Builds on and	determine if a conjecture	arguments using correct	arguments	include the use of
<b>Extends Prior</b>	is true	vocabulary		tangential relationships
Knowledge	Geometric relationships to	Justify congruence and	Model the conditions	Identify congruence and
of	demonstrate a working	similarity in the form of a	that determines	similarity conjectures
	knowledge of congruence	paragraph or flow chart	congruence and similarity	and how to apply them
	and similarity	proof		
Academic	Support will focus heavily	Support will focus on	Support will focus on all	Support will focus on all
Support	on helping students	helping students	of the mathematical	of the mathematical
	persevere in problem	persevere in solving	practice standards,	practice standards,
	solving and use the correct	multi-step problems,	helping students to	helping students to
	tools precisely. Teachers	use tools correctly	persevere and	persevere and
	will reference "parent"	and precisely, and to	collaborate in generating	collaborate to create
	problems, presented to	select useful	idiosyncratic solutions.	innovative solutions to
	give students problem-	mathematical	Later, they will use them	new problems. Students
	solving frameworks they	models. Teachers will	to create more	quickly move from
	can use in an ongoing	reference "parent"	general/powerful	learning foundational
	basis. In terms of	problems, presented	solutions for both proofs	ideas to applying them
	geometric proofs, the	to give students	and problems that	in novel contexts and
	focus will be on developing	problem-solving	require algebraic	new proofs.
	students' abilities to justify	frameworks they can	calculations.	
	their work and to	use in an ongoing	Students are taught	
	understand proofs that are	basis. Proofs will be	about building proofs and	
	presented in class.	presented that	are expected to use the	
		students can learn	proofs they know to	
		and understand.	create new, albeit similar,	
			proofs.	
Expectations	Students will be able	Students will be able	Students will be able to	Students will be able to
	to apply a range of	to apply a wide range	apply a wider range of	apply a wider range of
	mathematical	of mathematical	mathematical procedures	mathematical
	procedures (such as	procedures (such as	(such as area and	procedures (such as area
	area and perimeter	area and perimeter	perimeter calculations	and perimeter
	calculations and	calculations and	and geometric	calculations and
	geometric	geometric	constructions) with a high	geometric constructions)
	constructions)	constructions)	degree of accuracy and	with the highest degree

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	accurately and efficiently. With prompts and reviews, whenever necessary, student will recall relevant concepts and procedures, such as proportional reasoning and solving single-variable linear equations. Students are then expected to be able to apply those concepts and procedures towards the creation of new knowledge.	accurately and efficiently. Students will be able to recall relevant concepts and procedures, such as proportional reasoning and solving single-variable linear equations with some prompting and review, if necessary. Students are then expected to be able to apply those concepts and procedures towards the creation of new knowledge.	efficiency. Students will be able to recall relevant concepts and procedures, such as proportional reasoning and solving single-variable linear equations with little to no prompting. Students are then expected to be able to apply those concepts and procedures towards the creation of new knowledge.	of accuracy and efficiency. Students will be able to recall relevant concepts and procedures, such as proportional reasoning and solving single-variable linear equations with no prompting. Students are then expected to be able to apply those concepts and procedures towards the creation of new knowledge.
Course Goals	Students will to be able to explain their reasoning verbally when applying most mathematical procedures and be able to construct viable arguments to justify a solution method. Students will to work towards being able to independently make sense out of problems and devise entry point strategies for solving them.	Students will be able to explain their reasoning quantitatively when applying most mathematical procedures and construct viable arguments to justify a solution method. Students will be able to independently make sense out of problems and persevere towards solutions.	Students will be able to explain their reasoning abstractly when applying all mathematical procedures and be able to construct and critique viable arguments to justify a solution method. Students will be able to independently make sense out of problems and look for and make use of structure.	Students will be able to explain their reasoning abstractly when applying all mathematical procedures and be able to construct and critique viable arguments to justify a solution method.  Students will be able to independently make sense out of problems and while strategically using appropriate tools.
Course	Geometry Level 2 includes an analysis of plane, solid, and coordinate geometry as they relate to both abstract mathematical concepts as well as realworld problem situations. Topics include logic and proof, parallel lines and polygons, perimeter and area analysis, volume and surface area analysis and similarity and congruence. Emphasis will be placed on developing critical thinking skills as they relate to logical reasoning and argument. Students will be required to use different technological tools and manipulatives to discover and explain much of the course content.	Geometry College Prep includes a more in-depth analysis of plane geometry and the relationships between figures.	Geometry Honors extends the learning to include analytic geometry to derive formulas write conjectures.	Geometry Advanced adds enrichment and extension topics to include a higher degree of algebra required in the study and performance of transformations, Pythagorean Theorem, similarity, area and volume. Students also receive an early preview of trigonometry topics typically introduced to students in Algebra 2 or Precalculus.



#### ALGEBRA 2 AT-A-GLANCE

### **ALGEBRA 2**

Algebra 2 formalizes the idea of what makes a function and emphasizes various families of functions. Students will analyze and explain the general properties and behavior of functions of one variable, using appropriate graphing technologies. They will also identify and compare the properties of classes of functions. In addition to becoming proficient with linear, quadratic, and exponential functions,

**Performance Measures:** 

Classwork: 5-20% of grade

Homework: 5-10% of grade

Assessments: 70-85% of grade

students will begin to develop an understanding of logarithmic and polynomial functions as well. These topics will be utilized both for their abstract ideas and for modeling real-world phenomena.

The College Prep, Honors and Advanced levels will have higher expectations of Algebra 1 mastery and extend the learning to include more complex functions.

	Algebra 2 Level 2	Algebra 2 College Prep	Algebra 2 Honors	Algebra 2 Advanced
Prior	With prompts and	Students will be able	Students will be able to	Students will be able to
Knowledge	reviews, whenever	to recall relevant	recall relevant Algebra 1	recall relevant Algebra 1
Expectations	necessary, students	Algebra 1 and	and Geometry concepts	and Geometry concepts
	will be able to recall	Geometry concepts	and procedures with little	and procedures with no
	relevant Algebra 1 and	and procedures with	to no prompting.	prompting. Students are
	Geometry concepts	some prompting and	Students are then	then expected to be able
	and procedures.	review, if necessary.	expected to be able to	to apply those concepts
	Students are then	Students are then	apply those concepts and	and procedures towards
	expected to be able to	expected to be able to	procedures towards the	the creation of new
	apply those concepts	apply those concepts	creation of new	knowledge.
	and procedures	and procedures	knowledge.	
	towards the creation	towards the creation		
	of new knowledge.	of new knowledge.		
Academic	Assessments will be	Assessments will be	Review materials will be	Students will be
Support	preceded by extensive	preceded by review	provided to students as	expected to access
	review time with work	time with work that	well as a framework to	review materials as
	that models upcoming	models upcoming	best prepare for	needed and rely on
	tests and quizzes	tests and quizzes	upcoming assessments	strong study habits
Course Goals	Students will to be able to	Students will be able to	Students will be able to	Students will be able to
	explain their reasoning	explain their reasoning	explain their reasoning	explain their reasoning
	verbally when applying	quantitatively when	abstractly when applying	abstractly when applying
	most mathematical	applying most	all mathematical	all mathematical
	procedures and be able to	mathematical procedures	procedures and be able	procedures and be able
	construct viable	and construct viable	to construct and critique	to construct and critique
	arguments to justify a	arguments to justify a	viable arguments to	viable arguments to
	solution method.	solution method.	justify a solution method.	justify a solution
	Students will to work	Students will be able to	Students will be able to	method.
	towards being able to	independently make sense	independently make	Students will be able to
	independently make sense	out of problems and	sense out of problems	independently make
	out of problems and	persevere towards	and look for and make	sense out of problems
	devise entry point	solutions.	use of structure.	and while strategically
	strategies for solving			using appropriate tools.
	them.			
Course	Linear Functions	Linear Functions	Linear Functions	Linear Functions
Content	Quadratic Functions	Quadratic Functions	Quadratic Functions	Quadratic Functions
	Polynomial Functions	Polynomial Functions	Polynomial Functions	Polynomial Functions
	(Select)	Inverse Functions	Inverse Functions	Inverse Functions
	(Sciect)	mverse ranctions	mverse ranctions	mverse runetions

Inverse Function	ns Radical Functions	Radical Functions	Radical Functions
Radical Function	ns Exponential Functi	ions Exponential Function	ns Exponential Functions
Exponential Fur	nctions Logarithmic Functi	ions Logarithmic Function	ns Logarithmic Functions
Logarithmic Fur	nctions Rational Functions	(Select) Rational Functions	Rational Functions
(Select)	Conic Sections (Sel	lect) Conic Sections (Selec	ct) Conic Sections
Conic Sections (	Select)	Trigonometric Funct	ions Trigonometric Functions
		(Select)	



#### PRECALCULUS AT-A-GLANCE

# **PRECALCULUS**

Precalculus is designed to prepare students for success in college-level Calculus. The course provides a thorough examination of the properties, behavior and manipulation of important functions such as polynomial, rational, exponential, logarithmic and trigonometric functions. Beyond the study of these functions, the course also provides an in-depth treatment of Analytic Trigonometry, Sequences and Series and Limits.

**Performance Measures:** 

Classwork: 5-20% of grade

Homework: 5-10% of grade

Assessments: 70-85% of grade

The Honors and Advanced levels will spend little to no time reviewing Algebra 2 skills in order to include a unit on limits. The college prep course will forego the limits unit and, if time permits, include a unit on Probability and Counting, which would prepare students for college-level Statistics. .

	Precalculus College Prep	Precalculus Honors	Precalculus Advanced
Precalculus	Algebra 2 with extensive practice on	Algebra 2 with practice as	Prior master of all topics expected
Builds on and	radical/exponential expressions and	needed on radical/exponential	
Extends Prior	solving linear and quadratic	expressions and solving linear	
Knowledge of	f equations and quadratic equations		
	Polynomials to perform operations	Identify the asymptotes,	Prior master of these topics
	and Apply the Fundamental	intercepts, end behavior, etc. of	expected
	Theorem of Algebra	a rational function and its graph	
	Trigonometry to explore the unit	Identify cofunction identities	Use sinusoidal graphs as
	circle, sketch graphs and prove	and apply angle formulas	mathematical models
	trigonometric identities		
	Sequences to express them using	Sequences to express them	Correctly formulate and prove a
	summation notation	using summation notation	hypothesis using mathematical
			induction
	Statistics to compute probabilities	Statistics not taught at this level.	Statistics not taught at this level
		Construct Pascal's Triangle	
		expand binomial expressions	
	Limits not taught at this level	Functions to explain the concept	Identify intervals where a function
		of a limit and find their value	is continuous
Expectations	Students will be able to apply a	Students will be able to apply a	Students will be able to apply a
	wider range of mathematical	wider range of mathematical	wider range of mathematical
	procedures (often with the aim	procedures (often with the aim	procedures (often with the aim of
	of manipulating numbers and	of manipulating numbers and	manipulating numbers and
	equations into equivalent	equations into equivalent	equations into equivalent forms)
	forms) accurately and	forms) with a high degree of	with a high degree of accuracy
	efficiently.	accuracy and efficiency.	and efficiency. Students will be
	Students will be able to recall	Students will be able to recall	able to recall simplifying rational
	simplifying rational expressions	simplifying rational expressions	expressions and solving or
	and solving or factoring of	and solving or factoring of	factoring of quadratic equations
	quadratic equations with some	quadratic equations with little	with no prompting. Students are
	prompting and review, if	to no prompting. Students are	then expected to be able to apply
	necessary. Students are then	then expected to be able to	those concepts and procedures
	expected to be able to apply	apply those concepts and	towards the creation of new
	those concepts and procedures	procedures towards the	knowledge.
	towards the creation of new	creation of new knowledge.	
	knowledge.		
Course Goals	Students will be able to explain their	Students will be able to explain	Students will be able to explain
	reasoning quantitatively when	their reasoning abstractly when	their reasoning abstractly when
	applying most mathematical	applying all mathematical	applying all mathematical

	procedures and construct viable	procedures and be able to	procedures and be able to
	arguments to justify a solution	construct and critique viable	construct and critique viable
	method.	arguments to justify a solution	arguments to justify a solution
	Students will be able to	method.	method.
	independently make sense out of	Students will be able to	Students will be able to
	problems and persevere towards	independently make sense out	independently make sense out of
	solutions.		1
	solutions.	of problems and look for and make use of structure.	problems and while strategically
Causea Cantant	Droppleylys college was		using appropriate tools.
Course Content	Precalculus college prep	Precalculus Honors extends the	Precalculus Advanced extends the
	centers on functions, and aims to enable	learning to include following	learning to include following
		topics:	topics:
	students to decide what	Sequences and Series	Parametrics
	kind of function will best	Concept of a limit	Polar Coordinates
	fit a set of real-world		Infinite series and convergence
	data. As they did in		
	Algebra 2, students will		
	regularly work with		
	functions in four ways:		
	applying mathematics in		
	real situations;		
	representing		
	mathematical concepts		
	algebraically, verbally,		
	numerically, and		
	graphically; developing		
	and strategizing through		
	mathematical properties		
	and relationships; and		
	carrying out various		
	algorithms. This course		
	strives to give students a		
	balance between the		
	acquisition of key		
	concepts and the		
	mastery of skills that lay		
	the foundation for		
	calculus.		