



2017-2018
ACT Pathway



ACT Pathway



Imagine Math's ACT Pathway is built to equip students with the skills and conceptual understandings of high school level mathematics necessary for success in college.

This pathway progresses from pre-algebra and elementary algebra skills up through more sophisticated algebraic relationships. Linear, exponential and quadratic functions are interwoven so that students not only learn about each relationship individually, but also have an opportunity to compare them against one another and continually revisit each relationship in more complex ways. The pathway also takes students on a deep dive into probability concepts and geometric relationships.

Detailed information can be found on the ACT website:

<http://www.act.org/content/act/en/education-and-career-planning/college-and-careerreadiness-standards.html>

ACT

Learning Pathway

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Unit	Lesson Name	ACT Standard	ACT Standard Description
Ratios and Proportional Relationships	Using Proportions to Solve Problems	AF 601	Solve word problems containing several rates, proportions, or percentages
	Percent and Percent Change	AF 601	Solve word problems containing several rates, proportions, or percentages
		AF 701	Solve complex arithmetic problems involving percent of increase or decrease or requiring integration of several concepts (e.g., using several ratios, comparing percentages, or comparing averages)
Expressions and Equations	Identifying and Generating Equivalent Expressions	A 601	Manipulate expressions and equations
	Solving Equations with the Distributive Property in Context	A 601	Manipulate expressions and equations
The Number System	Operations with Rational Numbers I	N 603	Apply number properties involving positive/negative numbers
	Operations with Rational Numbers II	N 603	Apply number properties involving positive/negative numbers
Expressions and Equations	Understanding Properties of Integer Exponents	A 512	Work problems involving positive integer exponents
		N 605	Apply properties of rational exponents
	Applying Properties of Integer Exponents	A 512	Work problems involving positive integer exponents
		N 605	Apply properties of rational exponents
The Number System	Approximating Values of Irrational Numbers	N 604	Apply the facts that π is irrational and that the square root of an integer is rational only if that integer is a perfect square
Expressions and Equations	Interpreting Numbers Written in Scientific Notation	A 511	Work with scientific notation
	Operations with Numbers in Scientific Notation	A 511	Work with scientific notation

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Geometry	Pythagorean Theorem - Mixed Problems	G 508	Given the length of two sides of a right triangle, find the third when the lengths are Pythagorean triples
		G 602	Use the Pythagorean theorem
	Pythagorean Theorem - Distance Formula	G 602	Use the Pythagorean theorem
		G 605	Use the distance formula
Creating Equations	Writing and Solving Linear Equations in One Variable	A 502	Solve real-world problems by using first-degree equations
		AF 502	Build functions and write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
	Writing and Graphing Linear Equations in Two or More Variables	AF 503	Match linear equations with their graphs in the coordinate plane
Reasoning about Equations and Inequalities	Solving Linear Inequalities in One Variable	A 503	Solve first-degree inequalities when the method does not involve reversing the inequality sign
		A 601	Manipulate expressions and equations
		A 602	Solve linear inequalities when the method involves reversing the inequality sign
	Graphing Linear Inequalities	A 603	Match linear inequalities with their graphs on the number line
Creating Equations	Modeling Exponential Relationships with Equations, Inequalities, and Graphs	AF 702	Build functions and write expressions, equations, and inequalities when the process requires planning and/or strategic manipulation
		F 702	Build functions for relations that are exponential
Reasoning about Equations and Inequalities	Solving Systems of Linear Equations	A 604	Solve systems of two linear equations
Interpreting Functions	Function Notation II	F 505	Understand the concept of a function as having a well-defined output value at each valid input value
		F 507	Interpret statements that use function notation in terms of their context
	Interpreting Graphs of Linear and Exponential Functions in Context	AF 603	Interpret and use information from graphs in the coordinate plane
		AF 704	Analyze and draw conclusions based on information from graphs in the coordinate plane
	Understanding the Domain of a Function	F 504	Attend to the difference between a function modeling a situation and the reality of the situation
		F 506	Understand the concept of domain and range in terms of valid input and output, and in terms of function graphs
	Rate of Change for Linear and Exponential Functions	F 503	Build functions and use quantitative information to identify graphs for relations that are proportional or linear

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Building Functions	Transformations of Graphs of Linear and Exponential Functions	AF 604	Given an equation or function, find an equation or function whose graph is a translation by a specified amount up or down
		AF 705	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$
		AF 706	Given an equation or function, find an equation or function whose graph is a translation by specified amounts in the horizontal and vertical directions
	Writing Linear and Exponential Functions from a Context	AF 602	Build functions and write expressions, equations, and inequalities for common algebra settings (e.g., distance to a point on a curve and profit for variable cost and demand)
		AF 702	Build functions and write expressions, equations, and inequalities when the process requires planning and/or strategic manipulation
	Composite Functions	AF 602	Build functions and write expressions, equations, and inequalities for common algebra settings (e.g., distance to a point on a curve and profit for variable cost and demand)
		F 604	Evaluate composite functions at integer values
		F 708	Write an expression for the composite of two simple functions
	Writing Geometric Sequences Using an Explicit Formula	F 703	Exhibit knowledge of geometric sequences
	Writing Geometric Sequences Recursively	F 703	Exhibit knowledge of geometric sequences
F 603		Find a recursive expression for the general term in a sequence described recursively	
Writing Arithmetic Sequences Explicitly and Recursively	F 502	Find the next term in a sequence described recursively	
Arithmetic with Polynomials and Rational Expressions	Adding and Subtracting Polynomials	A 505	Add, subtract, and multiply polynomials
	Multiplying Polynomials	A 505	Add, subtract, and multiply polynomials
The Real Number System	Using Rational Exponents to Rewrite Expressions	N 605	Apply properties of rational exponents
Creating Equations	Modeling Quadratic Relationships with Equations, Inequalities, and Graphs	AF 702	Build functions and write expressions, equations, and inequalities when the process requires planning and/or strategic manipulation

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Seeing Structure in Expressions	Factoring Quadratic Expressions	A 506	Identify solutions to simple quadratic equations
		A 507	Solve quadratic equations in the form $(x + a)(x + b) = 0$, where a and b are numbers or variables
		A 508	Factor simple quadratics (e.g., the difference of squares and perfect square trinomials)
		A 605	Solve quadratic equations
Interpreting Functions	Sketching Graphs of Quadratic Functions in Context	G 609	Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle)
Building Functions	Writing Quadratic Functions from Their Graphs	AF 702	Build functions and write expressions, equations, and inequalities when the process requires planning and/or strategic manipulation
		G 609	Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle)
Interpreting Functions	Rewriting Quadratics to Reveal Their Structure	AF 702	Build functions and write expressions, equations, and inequalities when the process requires planning and/or strategic manipulation
		G 609	Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle)
Reasoning about Equations and Inequalities	Using the Quadratic Formula	A 506	Identify solutions to simple quadratic equations
		A 605	Solve quadratic equations
	Solving Quadratic Equations Graphically	A 506	Identify solutions to simple quadratic equations
Interpreting Functions	Rational Functions and Their Graphs	A 513	Determine when an expression is undefined
		F 508	Find the domain of polynomial functions and rational functions
		F 602	Build functions for relations that are inversely proportional
	Logarithmic Functions	F 707	Exhibit knowledge of logarithms
The Complex Number System	Complex Number Arithmetic	N 504	Exhibit some knowledge of the complex numbers
		N 606	Multiply two complex numbers
Statistics and Probability	Understanding the Effects of Outliers on Mean and Median	S 701	Distinguish between mean, median, and mode for a list of numbers
	Compound Probability	S 503	Compute straightforward probabilities for common situations

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Statistics and Probability (continued)	Patterns of Association in Data	S 502	Manipulate data from tables and charts
		S 702	Analyze and draw conclusions based on information from tables and charts, including two-way frequency tables
Interpreting Categorical and Quantitative Data	Fitting Functions to Data	F 701	Compare actual values and the values of a modeling function to judge model fit and compare
		S 506	Recognize that when a statistical model is used, model values typically differ from actual values
Conditional Probability and the Rules of Probability	Organizing Possible Outcomes of Events	S 603	Apply counting techniques
	Understanding Independent and Dependent Events	S 604	Compute a probability when the event and/or sample space are not given or obvious
		S 605	Recognize the concepts of conditional and joint probability expressed in real-world contexts
		S 606	Recognize the concept of independence expressed in real-world contexts
		S 704	Exhibit knowledge of conditional and joint probability
	Understanding Conditional Probability	S 604	Compute a probability when the event and/or sample space are not given or obvious
		S 605	Recognize the concepts of conditional and joint probability expressed in real-world contexts
		S 704	Exhibit knowledge of conditional and joint probability
	Modeling Probability Situations Using Two-Way Frequency Tables	S 504	Use Venn diagrams in counting
		S 602	Interpret and use information from tables and charts, including two-way frequency tables
		S 702	Analyze and draw conclusions based on information from tables and charts, including two-way frequency tables
	Relating Probabilities of Unions and Intersections of Events	S 604	Compute a probability when the event and/or sample space are not given or obvious
		S 605	Recognize the concepts of conditional and joint probability expressed in real-world contexts
		S 704	Exhibit knowledge of conditional and joint probability
Geometry	Volume of Composite Solids	G 405	Use geometric formulas when all necessary information is given
Congruence	Defining Transformations	G 607	Find the coordinates of a point reflected across a vertical or horizontal line or across $y = x$
		G 608	Find the coordinates of a point rotated 90° about the origin
	Rotational and Reflectional Symmetry	G 502	Count the number of lines of symmetry of a geometric figure
	What is Proof?	G 704	Analyze and draw conclusions based on a set of conditions

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Congruence (continued)	Proving Theorems About Lines and Angles	G 704	Analyze and draw conclusions based on a set of conditions
Similarity, Right Triangles, and Trigonometry	Problem Solving with Congruent Triangles	G 603	Apply properties of 30° - 60° - 90° , 45° - 45° - 90° , similar, and congruent triangles
		G 705	Solve multistep geometry problems that involve integrating concepts, planning, and/or visualization
Congruence	Proving Theorems About Relationships in Triangles	G 704	Analyze and draw conclusions based on a set of conditions
	Proving Theorems About Parallelograms	G 704	Analyze and draw conclusions based on a set of conditions
Similarity, Right Triangles, and Trigonometry	Properties of Dilations I	G 703	Use scale factors to determine the magnitude of a size change
	Problem Solving with Transformations and Similarity	G 705	Solve multistep geometry problems that involve integrating concepts, planning, and/or visualization
	Proving Theorems About Similar Triangles	G 704	Analyze and draw conclusions based on a set of conditions
	Problem Solving with Similarity and Trigonometric Ratios	G 509	Express the sine, cosine, and tangent of an angle in a right triangle as a ratio of given side lengths
		G 604	Apply basic trigonometric ratios to solve right-triangle problems
Sine and Cosine of Complementary Angles	G 509	Express the sine, cosine, and tangent of an angle in a right triangle as a ratio of given side lengths	
Geometric Measurement and Dimension	Understanding Formulas for Curved Figures	G 601	Use relationships involving area, perimeter, and volume of geometric figures to compute another measure (e.g., surface area for a cube of a given volume and simple geometric probability)
Expressing Geometric Properties with Equations	Problem Solving with Coordinates of Parallel and Perpendicular Lines	G 606	Use properties of parallel and perpendicular lines to determine an equation of a line or coordinates of a point
The Number System	Midpoint Practice	G 511	Find the midpoint of a line segment
Expressing Geometric Properties with Equations	Dividing a Segment Proportionally	G 511	Find the midpoint of a line segment
	Using Coordinates to Find Perimeters and Areas	G 605	Use the distance formula

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Circles	Tangents, Chords, Radii and Angles in Circles	G 701	Use relationships among angles, arcs, and distances in a circle
Expressing Geometric Properties with Equations	Problem Solving with the Equation of a Circle	G 609	Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle)

