

Content Guidelines

Overview

The Pearson Video Challenge is open to all students, but all video submissions must relate to set of predetermined curriculum areas and topics. In the following pages the selected topics for Algebra, Geometry and Algebra 2 are listed. While the video topics are quite specific, *how* the video addresses these topics is wide open. Student videos can be documentaries, dramatic re-creations, animated cartoons, music videos, or any form of presentation. Creativity is encouraged, as is specificity of the topic chosen.

Pearson has several student videos that can serve as samples of the kinds of student videos that can be produced. Specifically, the following videos are available to share with students:

- 1) A segment on basketball that also deals with scatterplot data.
- 2) A science fiction segment that deals with linear functions.

The math topic is clearly explained, while the video narrative is something that students can relate to. The reason for sharing these videos with students is simply to encourage them to think creatively about the videos.

Algebra 1

Table of Contents

Chapter 1: Foundations for Algebra

- 1-1 Variables and Expressions
- 1-2 Order of Operations and Evaluating Expressions
- 1-3 Real Numbers and the Number Line
- 1-4 Properties of Real Numbers
- 1-5 Adding and Subtracting Real Numbers
- 1-6 Multiplying and Dividing Real Numbers
- 1-7 The Distributive Property
- 1-8 An Introduction to Equations and Solutions
- 1-9 Patterns, Equations, and Graphs

Chapter 2: Solving Equations

- 2-1 Solving One-Step Equations
- 2-2 Solving Two-Step Equations
- 2-3 Solving Multi-Step Equations
- 2-4 Solving Equations with Variables on Both Sides
- 2-5 Literal Equations and Formulas
- 2-6 Ratios, Rates, and Conversions
- 2-7 Solving Proportions
- 2-8 Proportions and Similar Figures
- 2-9 Percents
- 2-10 Change Expressed as a Percent

Chapter 3: Solving Inequalities

- 3-1 Inequalities and Their Graphs
- 3-2 Solving Inequalities Using Addition or Subtraction
- 3-3 Solving Inequalities Using Multiplication or Division
- 3-4 Solving Multi-Step Inequalities
- 3-5 Working with Sets
- 3-6 Compound Inequalities
- 3-7 Absolute Value Equations and Inequalities
- 3-8 Unions and Intersections of Sets

Chapter 4: An Introduction to Functions

- 4-1 Using Graphs to Relate Two Quantities
- 4-2 Patterns and Linear Functions
- 4-3 Patterns and Nonlinear Functions
- 4-4 Graphing a Function Rule
- 4-5 Writing a Function Rule
- 4-6 Formalizing Relations and Functions
- 4-7 Sequences and Functions

Chapter 5: Linear Functions

- 5-1 Rate of Change and Slope
- 5-2 Direct Variation
- 5-3 Slope-Intercept Form

- 5-4 Point-Slope Form
- 5-5 Standard Form
- 5-6 Parallel and Perpendicular Lines
- 5-7 Scatter Plots and Trend Lines
- 5-8 Graphing Absolute Value Functions

Chapter 6: Systems of Linear Equations and Inequalities

- 6-1 Solving Systems by Graphing
- 6-2 Solving Systems Using Substitution
- 6-3 Solving Systems Using Elimination
- 6-4 Applications of Linear Systems
- 6-5 Linear Inequalities
- 6-6 Systems of Linear Inequalities

Chapter 7: Exponents and Exponential Functions

- 7-1 Zero and Negative Exponents
- 7-2 Scientific Notation
- 7-3 Multiplying Powers with the Same Base
- 7-4 More Multiplication Properties of Exponents
- 7-5 Division Properties of Exponents
- 7-6 Exponential Functions
- 7-7 Exponential Growth and Decay

Chapter 8: Polynomials and Factoring

- 8-1 Adding and Subtracting Polynomials
- 8-2 Multiplying and Factoring
- 8-3 Multiplying Binomials
- 8-4 Multiplying Special Case Binomials
- 8-5 Factoring $x^2 + bx + c$
- 8-6 Factoring $ax^2 + bx + c$
- 8-7 Factoring Special Cases
- 8-8 Factoring by Grouping

Chapter 9: Quadratic Functions and Equations

- 9-1 Quadratic Graphs and Their Properties
- 9-2 Quadratic Functions
- 9-3 Solving Quadratic Equations
- 9-4 Factoring to Solve Quadratic Equations
- 9-5 Completing the Square
- 9-6 The Quadratic Formula and the Discriminant
- 9-7 Choosing a Linear, Quadratic, or Exponential Model
- 9-8 Systems of Linear and Quadratic Equations

Chapter 10: Radical Expressions and Equations

- 10-1 Pythagorean Theorem
- 10-2 Simplifying Radicals
- 10-3 Operations with Radical Expressions
- 10-4 Solving Radical Equations
- 10-5 Graphing Square Root Functions
- 10-6 Trigonometric Ratios

Chapter 11: Rational Expressions and Functions

- 11-1 Inverse Variation
- 11-2 Graphing Rational Functions
- 11-3 Simplifying Rational Expressions
- 11-4 Multiplying and Dividing Rational Expressions
- 11-5 Dividing Polynomials
- 11-6 Adding and Subtracting Rational Expressions
- 11-7 Solving Rational Equations

Chapter 12: Data Analysis and Probability

- 12-1 Organizing Data Using Matrices
- 12-2 Frequency and Histograms
- 12-3 Measures of Central Tendency and Dispersion
- 12-4 Box-and-Whisker Plots
- 12-5 Samples and Surveys
- 12-6 Permutations and Combinations
- 12-7 Theoretical and Experimental Probability
- 12-8 Probability of Compound Events

Geometry

Table of Contents

Chapter 1: Tools of Geometry

- 1-1 Nets and Drawings for Visualizing Geometry
- 1-2 Points, Lines, and Planes
- 1-3 Measuring Segments
- 1-4 Measuring Angles
- 1-5 Exploring Angle Pairs
- 1-6 Basic Constructions
- 1-7 Midpoint and Distance in the Coordinate Plane
- 1-8 Perimeter, Circumference, and Area

Chapter 2: Reasoning and Proof

- 2-1 Patterns and Inductive Reasoning
- 2-2 Conditional Statements
- 2-3 Biconditionals and Definitions
- 2-4 Deductive Reasoning
- 2-5 Reasoning in Algebra and Geometry
- 2-6 Proving Angles Congruent

Chapter 3: Parallel and Perpendicular Lines

- 3-1 Lines and Angles
- 3-2 Properties of Parallel Lines
- 3-3 Proving Lines Parallel
- 3-4 Parallel and Perpendicular Lines
- 3-5 Parallel Lines and Triangles
- 3-6 Constructing Parallel and Perpendicular Lines
- 3-7 Equations of Lines in the Coordinate Plane
- 3-8 Slopes of Parallel and Perpendicular Lines

Chapter 4: Congruent Triangles

- 4-1 Congruent Figures
- 4-2 Triangle Congruence by SSS and SAS
- 4-3 Triangle Congruence by ASA and AAS
- 4-4 Using Corresponding Parts of Congruent Triangles
- 4-5 Isosceles and Equilateral Triangles
- 4-6 Congruence in Right Triangles
- 4-7 Congruence in Overlapping Triangles

Chapter 5: Relationships Within Triangles

- 5-1 Midsegments of a Triangle
- 5-2 Bisectors in Triangles
- 5-3 Perpendicular and Angle Bisectors
- 5-4 Medians and Altitudes
- 5-5 Indirect Proof
- 5-6 Inequalities in One Triangle
- 5-7 Inequalities in Two Triangles

Chapter 6: Polygons and Quadrilaterals

- 6-1 The Polygon-Angle Sum Theorems
- 6-2 Properties of Parallelograms
- 6-3 Proving That a Quadrilateral is a Parallelogram
- 6-4 Properties of Rhombuses, Rectangles, and Squares
- 6-5 Conditions for Rhombuses, Rectangles, and Squares
- 6-6 Trapezoids and Kites
- 6-7 Polygons in the Coordinate Plane
- 6-8 Applying Coordinate Geometry
- 6-9 Proofs Using Coordinate Geometry

Chapter 7: Similarity

- 7-1 Ratios and Proportions
- 7-2 Similar Polygons
- 7-3 Proving Triangles Similar
- 7-4 Similarity in Right Triangles
- 7-5 Proportions in Triangles

Chapter 8: Right Triangles and Trigonometry

- 8-1 The Pythagorean Theorem and Its Converse
- 8-2 Special Right Triangles
- 8-3 Trigonometry
- 8-4 Angles of Elevation and Depression
- 8-5 Vectors

Chapter 9: Transformations

- 9-1 Translations
- 9-2 Reflections
- 9-3 Rotations
- 9-4 Symmetry
- 9-5 Dilations
- 9-6 Compositions of Reflections
- 9-7 Tessellations

Chapter 10: Area

- 10-1 Areas of Parallelograms and Triangles
- 10-2 Areas of Trapezoids, Rhombuses, and Kites
- 10-3 Areas of Regular Polygons
- 10-4 Perimeters and Areas of Similar Figures
- 10-5 Trigonometry and Area
- 10-6 Circles and Arcs
- 10-7 Areas of Circles and Sectors
- 10-8 Geometric Probability

Chapter 11: Surface Area and Volume

- 11-1 Space Figures and Cross Sections
- 11-2 Surface Areas of Prisms and Cylinders
- 11-3 Surface Areas of Pyramids and Cones
- 11-4 Volumes of Prisms and Cylinders
- 11-5 Volumes of Pyramids and Cones

- 11-6 Surface Areas and Volumes of Spheres
- 11-7 Areas and Volumes of Similar Solids

Chapter 12: Circles

- 12-1 Tangent Lines
- 12-2 Chords and Arcs
- 12-3 Inscribed Angles
- 12-4 Angle Measures and Segment Lengths
- 12-5 Circles in the Coordinate Plane
- 12-6 Locus: A Set of Points

Algebra 2

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Chapter 1: Expressions, Equations, and Inequalities

- 1-1 Patterns and Expressions
- 1-2 Properties of Real Numbers
- 1-3 Algebraic Expressions
- 1-4 Solving Equations
- 1-5 Solving Inequalities
- 1-6 Absolute Value Equations and Inequalities

Chapter 2: Functions, Equations, and Graphs

- 2-1 Relations and Functions
- 2-2 Direct Variation
- 2-3 Slope-Intercept Form
- 2-4 Linear Equations or More Linear Equations
- 2-5 Using Linear Models (line of best fit)
- 2-6 Families of Functions (transformations)
- 2-7 Absolute Value Functions and Graphs
- 2-8 Two Variable Inequalities

Chapter 3: Linear Systems

- 3-1 Solving Systems Using Tables and Graphs
- 3-2 Solving Systems Algebraically
- 3-3 Systems of Inequalities
- 3-4 Linear Programming
- 3-5 Systems With Three Variables
- 3-6 Solving Systems Using Matrices

Chapter 4: Quadratic Functions and Equations

- 4-1 The Quadratic Function and Its Transformations
- 4-2 Standard Form of a Quadratic Function
- 4-3 Modeling With Quadratic Functions
- 4-4 Factoring Quadratic Expressions
- 4-5 Quadratic Equations
- 4-6 Completing the Square
- 4-7 The Quadratic Formula
- 4-8 Complex Numbers
- 4-9 Systems of Quadratic Equations and Inequalities

Chapter 5: Polynomials and Polynomial Functions

- 5-1 Polynomial Functions
- 5-2 Zeros and Linear Factors
- 5-3 Solving Polynomial Equations
- 5-4 Dividing Polynomials
- 5-5 Theorems About Roots of Polynomial Equations
- 5-6 The Fundamental Theorem of Algebra
- 5-7 The Binomial Theorem

- 5-8 Polynomial Models in the Real World
- 5-9 Transforming Polynomial Functions

Chapter 6: Radical Functions and Rational Exponent

- 6-1 Roots and Radical Expressions
- 6-2 Multiplying and Dividing Radical Expressions
- 6-3 Binomial Radical Expressions
- 6-4 Rational Exponents
- 6-5 Solving Sq Root and Other Radical Equations
- 6-6 Function Operations
- 6-7 Inverse Relations and Functions
- 6-8 Graphing Sq Root and Other Radical Functions

Chapter 7: Exponential and Logarithmic Functions

- 7-1 Exploring Exponential Models
- 7-2 Properties of Exponential Functions
- 7-3 Logarithmic Functions as Inverses
- 7-4 Properties of Logarithms
- 7-5 Exponential and Logarithmic Equations
- 7-6 Natural Logarithms

Chapter 8: Rational Functions

- 8-1 Inverse Variation
- 8-2 The Reciprocal Function Family
- 8-3 Rational Functions and Their Graphs
- 8-4 Rational Expressions
- 8-5 Adding and Subtracting Rational Expressions
- 8-6 Solving Rational Equations

Chapter 9: Sequences and Series

- 9-1 Mathematical Patterns
- 9-2 Arithmetic Sequences
- 9-3 Geometric Sequences
- 9-4 Arithmetic Series
- 9-5 Geometric Series

Chapter 10: Quadratic Relations and Conic Sections

- 10-1 Exploring Conic Sections
- 10-2 Parabolas
- 10-3 Circles
- 10-4 Ellipses
- 10-5 Hyperbolas
- 10-6 Translating Conic Sections

Chapter 11: Probability and Statistics

- 11-1 Permutations and Combinations
- 11-2 Probability
- 11-3 Probability of Multiple Events
- 11-4 Conditional Probability
- 11-5 Analyzing Data

- 11-6 Standard Deviation
- 11-7 Working With Samples and Surveys
- 11-8 Binomial Distributions
- 11-9 Normal Distributions

Chapter 12 Matrices

- 12-1 Adding and Subtracting Matrices
- 12-2 Matrix Multiplication
- 12-3 Matrices, Determinants, and Inverses
- 12-4 Inverse Matrices and Systems
- 12-5 Geometric Transformations With Matrices
- 12-6 Vectors

Chapter 13 Periodic Functions and Trigonometry

- 13-1 Exploring Periodic Data
- 13-2 Angles and the Unit Circle
- 13-3 Radian Measure
- 13-4 The Sine Function
- 13-5 The Cosine Function
- 13-6 The Tangent Function
- 13-7 Translating Sine and Cosine Functions
- 13-8 Reciprocal Trigonometric Functions

Chapter 14 Trigonometric Identities and Equations

- 14-1 Trigonometric Identities
- 14-2 Solving Trig Equations Using Inverses
- 14-3 Right Triangles and Trigonometric Ratios
- 14-4 Area and the Law of Sines
- 14-5 The Law of Cosines
- 14-6 Angle Identities
- 14-7 Double Angle and Half Angle Identities