CollegeBoard SpringBoard

2014c Course 3
Khan Academy Video Correlations
By SpringBoard Activity

SB Activity	Video(s)
Unit 1: Numerical Relationships	
	Patterns
Activity 1 *Investigating Patterns* 1-1 Learning Targets: • Analyze simple sequences. • Describe patterns in simple sequences and give the next terms in a sequence. 1-2 Learning Targets: • Analyze more complex sequences. • Describe patterns in sequences and develop methods for predicting any term in a sequence 1-3 Learning Targets: • Understand increasing and decreasing sequences. • Analyze sequences containing mathematical operations and those based on other patterns.	***Number patterns: Seeing relationships*** ***Number patterns: interpreting relationships*** ***Math patterns example 1*** ***Math patterns example 2***
Activity 2 *Operations with Fractions* 2-1 Learning Targets: • Represent a real-world context with fractions. • Simplify expressions involving fractions by adding and subtracting 2-2 Learning Targets: • Represent a real-world context with fractions. • Simplify expressions involving fractions by multiplying and dividing. • Write the reciprocal of a number.	***Adding and Subtracting Fractions*** Adding, subtracting fractions ***Multiplying and Dividing Fractions*** Multiplying negative and positive fractions
Activity 3 *Powers and Roots* 3-1 Learning Targets: • Interpret and simplify the square of a number. • Determine the square root of a perfect square 3-2 Learning Targets: • Interpret and simplify the cube of a	***Exponents*** Introduction to exponents Exponent example 1 Exponent example 2 ***Roots*** Understanding square roots Finding cube roots

number. • Determine the cube root of a perfect cube 3-3 Learning Targets: • Simplify expressions with powers and roots. • Follow the order of operations to simplify expressions	***Order of Operations*** Introduction to order of operations Order of operations example Order of operations example: putting it all together
Activity 4 *Rational Numbers* 4-1 Learning Targets: • Model fractions graphically. • Convert between fractions, decimals, and percents. 4-2 Learning Targets: • Define and recognize rational numbers. • Represent repeating decimals using bar notation. • Convert a repeating decimal to a fraction. 4-3 Learning Targets: • Compare rational numbers in different forms. • Represent repeating decimals using bar notation. • Utilize various forms of rational numbers.	***Converting Between Forms of Rational Numbers*** Converting percent to decimal and fraction Fraction to decimal Converting fractions to decimals Converting a fraction to a repeating decimal Converting repeating decimals to fractions 1 Converting repeating decimals to fractions 2 Converting decimals to fractions 2 (ex 1) Converting decimals to fractions 2 (ex 2) Converting decimals to percents Converting decimals to percents example 2 Converting percents to decimals Converting percents to decimals example 2
Activity 5 *Rational and Irrational Numbers* 5-1 Learning Targets: • Differentiate between rational and irrational numbers. • Approximate an irrational number in terms of a rational number 5-2 Learning Targets: • Approximate an irrational number in terms of a rational number. • Compare and order irrational and rational numbers.	***Irrational Numbers*** Introduction to rational and irrational numbers Recognizing irrational numbers Approximating irrational number exercise example
Activity 6 *Properties of Exponents* 6-1 Learning Targets: • Understand and apply properties of integer exponents. • Simplify multiplication expressions with integer exponents.	***Properties of Positive Exponents*** Exponent properties involving products Exponent properties involving quotients Products and exponents raised to an exponent properties Exponent rules part 1

• Simplify division expressions with integer exponents. 6-2 Learning Targets: • Understand and apply properties of integer exponents. • Simplify expressions with negative exponents. 6-3 Learning Targets: • Understand and apply properties of integer exponents. • Simplify expressions with zero as the exponent. • Simplify expressions with exponents raised to a power.	Exponent rules part 2 ***Properties of Zero, Fractional, and Negative Exponents*** Negative exponents Zero, negative, and fractional exponents
Activity 7 *Scientific Notation* 7-1 Learning Targets: • Express numbers in scientific notation. • Convert numbers in scientific notation to standard form. • Use scientific notation to write estimates of quantities. 7-2 Learning Targets: • Express numbers in scientific notation. • Convert numbers in scientific notation to standard form. • Compare and order numbers in scientific notation. • Use scientific notation to write estimates of quantities.	***Scientific Notation*** Introduction to scientific notation Scientific notation Scientific notation examples Scientific notation example 1 Scientific notation example 2
Activity 8 *Operations with Scientific Notation* 8-1 Learning Targets: • Multiply numbers expressed in scientific notation. • Divide numbers expressed in scientific notation 8-2 Learning Targets: • Add numbers expressed in scientific notation. • Subtract numbers expressed in scientific notation.	***Multiplying and Dividing in Scientific Notation*** Multiplying and dividing in scientific notation Multiplying in scientific notation Multiplying in scientific notation example Dividing in scientific notation example
Unit 2: Equations	
Activity 9 *Writing Expressions* 9-1 Learning Targets:	***Algebraic Expressions*** What is a variable? Expression terms, factors, and coefficients

• Identify and represent patterns using models, tables, and expressions. • Write and evaluate algebraic expressions that represent patterns with constant differences. 9-2 Learning Targets: • Identify patterns that do not have a constant difference. • Write and evaluate algebraic expressions that represent patterns that do not have a constant difference.	***Representing Patterns*** Number patterns: Seeing relationships Number patterns: interpreting relationships Math patterns example 1 Math patterns example 2 ***Writing Algebraic Expressions*** Writing simple algebraic expressions Writing algebraic expressions Writing algebraic expressions word problem ***Evaluating Algebraic Expressions*** Evaluating an expression example Evaluating an expression using substitution
Activity 10 *Solving Equations* 10-1 Learning Targets: • Solve linear equations with rational number coefficients. • Solve linear equations by using the Distributive Property and collecting like terms. 10-2 Learning Targets: • Use linear equations with one variable to model and solve real-world and mathematical problems. • Solve linear equations with variables on both sides of the equation by using the Distributive Property and collecting like terms.	***Solving Linear Equations with Variables on Both Sides*** Variables on both sides Example 1: Variables on both sides Example 2: Variables on both sides Equation special cases Ex 2: Multi-step equation ***Solving Equations Using the Distributive Property*** Solving equations with the distributive property Solving equations with the distributive property 2 Ex 1: Distributive property to simplify Ex 2: Distributive property to simplify Ex 3: Distributive property to simplify ***Number of Solutions to a Linear Equation*** Number of solutions to linear equations Number of solutions to linear equations ex 2 Number of solutions to linear equations ex 3
Activity 11 *Exploring Slope* 11-1 Learning Targets: • Understand the concept of slope as the ratio $\frac{change\ in\ y}{change\ in\ x}$ between any two points on a line. • Graph proportional relationships; interpret the slope and the y-intercept (0, 0) of the graph.	Slope Slope of a line Slope of a line 2 Slope of a line 3 Graphical slope of a line Slope example ***y-intercepts*** Interpreting intercepts of linear functions

• Use similar right triangles to develop an understanding of slope, 11-2 Learning Targets: • Understand the connections among proportional relationships, lines, and linear equations. • Graph proportional relationships; interpret the slope and the y-intercept (0, y) of graphs. • Examine linear relationships as graphs and as equations to solve real-world problems.	Interpreting linear functions example
Activity 12 *Slope-Intercept Form* 12-1 Learning Targets: • Graph linear relationships represented in different forms. • Write an equation in the form y = mx + b to model a linear relationship between two quantities. • Interpret the meaning of slope and y-intercept in a problem context. 12-2 Learning Targets: • Compare different proportional relationships represented in different ways. • Graph linear relationships and identify and interpret the meaning of slope in graphs. 12-3 Learning Targets: • Derive equations of the form y = mx and y = mx + b from their graphs. • Graph linear relationships and identify and interpret the meaning of slope and y-intercept in graphs.	***Graphing Linear Equations*** Graphing a line in slope intercept form **Writing Linear Equations** Multiple examples of constructing linear equations in slope-intercept form ***Interpreting Key Characteristics of Linear Functions*** Interpreting linear functions example Interpreting intercepts of linear functions
Activity 13 *Proportional Relationships* 13-1 Learning Targets: • Represent linear proportional situations with tables, graphs, and equations. • Identify slope and y-intercept in these representations and interpret their meaning in real-life contexts. 13-2 Learning Targets: • Solve problems involving direct variation.	***Linear Proportional Relationships*** Graphing proportional relationships example Graphing proportional relationships example 2 Graphing proportional relationships example 3 Constructing an equation for a proportional relationship ***Directly Proportional Relationships*** Analyzing proportional relationships from a table

• Distinguish between proportional and nonproportional situations using tables, graphs, and equations	Comparing proportional relationships
Activity 14 *Graphing Systems of Linear Equations* 14-1 Learning Targets: • Understand that solutions to systems of linear equations correspond to the points of intersection of their graphs. • Solve systems of linear equations numerically and by graphing. • Use systems of linear equations to solve real-world and mathematical problems. 14-2 Learning Targets: • Convert linear equations into slope-intercept form. • Solve systems of linear equations by graphing. • Solve simple systems of linear equations by inspection.	***Solving Systems of Linear Equations Graphically*** Solving linear systems by graphing Solving systems graphically Graphing systems of equations Graphical systems application problem Example 2: Graphically solving systems Example 3: Graphically solving systems Testing a solution for a system of equations
Activity 15 *Solving Systems of Linear Equations Algebraically* 15-1 Learning Targets: • Connect solutions to systems of linear equations to the points of intersection of their graphs. • Solve systems of linear equations algebraically 15-2 Learning Targets: • Write linear systems to solve real-world and mathematical problems. • Solve systems of linear equations algebraically.	***Solving Linear Systems Algebraically: Substitution*** The substitution method Substitution method 2 Substitution method 3 Example 1: Solving systems by substitution Example 2: Solving systems by substitution Example 3: Solving systems by substitution Practice using substitution for systems ***Solving Linear Systems Algebraically: Elimination*** Example 1: Solving systems by elimination Example 2: Solving systems by elimination Example 3: Solving systems by elimination Addition elimination method 1 Addition elimination method 2 Addition elimination method 3 Addition elimination method 4 ***Applications of Linear Systems*** Using a system of equations to find the price of apples and oranges Linear systems word problem with substitution

	Systems of equation to realize you are getting ripped off Thinking about multiple solutions to a system of equations
Unit 3: Geometry	
Activity 16 *Angle-Pair Relationships* 16-1 Learning Targets: • Identify and determine the measure of complementary angles. • Identify and determine the measure of supplementary angles. 16-2 Learning Targets: • Determine the measure of angles formed by parallel lines and transversals. • Identify angle pairs formed by parallel lines and transversals.	***Complementary and Supplementary Angles*** Complementary and supplementary angles Find measure of complementary angles Find measure of supplementary angles ***Angles formed by Parallel Lines and Transversals*** Angles formed by parallel lines and transversals Figuring out angles between transversal and parallel lines Using algebra to find measures of angles formed from transversal
Activity 17 *Angles of Triangles and Quadrilaterals* 17-1 Learning Targets: • Describe the relationship among the angles of a triangle. • Write and solve equations involving angles of a triangle. 17-2 Learning Targets: • Describe and apply the relationship between an exterior angle of a triangle and its remote interior angles. • Describe and apply the relationship among the angles of a quadrilateral.	***Angles in Triangles*** Proof: Sum of measures of angles in a triangle are 180 Triangle angle example 1 Triangle angle example 2 Triangle angle example 3 Challenging triangle angle problem Finding more angles
Activity 18 *Introduction to Transformations* 18-1 Learning Targets: • Recognize rotations, reflections, and translations in physical models. • Explore rigid transformations of figures. 18-2 Learning Targets: • Determine the effect of translations on two-dimensional figures using coordinates. • Represent and interpret translations involving words, coordinates, and symbols. 18-3 Learning Targets: • Determine the effect of reflections on	***Translations and Coordinates*** Translations of polygons Determining a translation for a shape ***Reflections and Coordinates*** Reflection and mapping points example ***Rotations and Coordinates*** Rotation of polygons example Performing a rotation to match figures Rotating segment about origin example

two-dimensional figures using coordinates. • Represent and interpret reflections involving words, coordinates, and symbols. 18-4 Learning Targets: • Determine the effect of rotations on two-dimensional figures using coordinates. • Represent and interpret rotations involving words, coordinates, and symbols.	
Activity 19 *Rigid Transformations and Compositions* 19-1 Learning Targets: • Explore properties of translations, rotations, and reflections on two-dimensional figures. • Explore congruency of transformed figures. 19-2 Learning Targets: • Explore composition of transformations. • Describe the effect of composition of translations, rotations, and reflections on two-dimensional figures using coordinates.	***Congruence and Transformations*** Testing congruence by transformations example Another congruence by transformation example
Activity 20 *Similar Triangles* 20-1 Learning Targets: • Identify similar triangles. • Identify corresponding sides and angles in similar triangles. 20-2 Learning Targets: • Determine whether triangles are similar given side lengths or angle measures. • Calculate unknown side lengths in similar triangles.	***Exploring Similar Triangles*** Testing similarity through transformations Similar triangles
Activity 21 *Dilations* 21-1 Learning Targets: • Investigate the effect of dilations on two-dimensional figures. • Explore the relationship of dilated figures on the coordinate plane. 21-2 Learning Targets: • Determine the effect of the value of the scale factor on a dilation.	***Dilations*** Thinking about dilations Scaling down a triangle by half

• Explore how scale factor affects two-dimensional figures on a coordinate plane.	
Activity 22 *The Pythagorean Theorem* 22-1 Learning Targets: • Investigate the Pythagorean Theorem. • Understand and apply the Pythagorean Theorem. 22-2 Learning Targets: • Investigate the Pythagorean Theorem. • Find missing side lengths of right triangles using the Pythagorean Theorem.	***Pythagorean Theorem Basics*** The Pythagorean theorem intro Pythagorean theorem Pythagorean theorem 2
Activity 23 *Applying the Pythagorean Theorem* 23-1 Learning Targets: • Apply the Pythagorean Theorem to solve problems in two dimensions. • Apply the Pythagorean Theorem to solve problems in three dimensions. 23-2 Learning Targets: • Apply the Pythagorean Theorem to right triangles on the coordinate plane. • Find the distance between points on the coordinate plane.	***Applications of the Pythagorean Theorem*** Pythagorean theorem 1 Pythagorean theorem 3 Thiago asks: How much time does a goalkeeper have to react to a penalty kick? Pythagorean theorem in 3D
Activity 24 *Converse of the Pythagorean Theorem* 24-1 Learning Targets: • Explain the converse of the Pythagorean Theorem. • Verify whether a triangle with given side lengths is a right triangle. 24-2 Learning Targets: • Verify whether a set of whole numbers is a Pythagorean triple. • Use a Pythagorean triple to generate a new Pythagorean triple.	**N/A**
Activity 25 *Surface Area* 25-1 Learning Targets: • Find the lateral and surface areas of rectangular prisms. • Find the lateral and surface areas of triangular prisms. 25-2 Learning Targets:	***Surface Area*** Nets of polyhedra Finding surface area: nets of polyhedra

• Find the lateral area of cylinders. • Find the surface area of cylinders.	
Activity 26 *Volumes of Solids* 26-1 Learning Targets: • Apply the formula for the volume of a prism. • Apply the formula for the volume of a pyramid. 26-2 Learning Targets: • Apply the formula for the volume of a cone. • Apply the formula for the volume of a cylinder. • Apply the formula for the volume of a sphere. 26-3 Learning Targets: • Decompose composite solids into simpler three-dimensional figures. • Find the volume of composite solids.	***Volume*** Find the volume of a triangular prism and cube Cylinder volume and surface area Volume of a cone Volume of a sphere
Unit 4: Functions	
Activity 27 *Introduction to Functions* 27-1 Learning Targets: • Define relation and function. • Evaluate functions. 27-2 Learning Targets: • Understand that a function is a rule that assigns exactly one output to each input. • Identify functions using ordered pairs, tables, and mappings. 27-3 Learning Targets: • Define domain and range. • Determine the domain and range of a relation. 27-4 Learning Targets: • Identify functions using graphs. • Understand the difference between discrete and continuous data.	***What is a Function*** What is a function? Difference between equations and functions Evaluating with function notation Understanding function notation (example 1) Understanding function notation (example 2) Understanding function notation (example 3) ***Mapping Inputs and Outputs*** Relations and functions Testing if a relationship is a function ***Identifying Functions*** Domain and range of a relation Domain and range of a function Domain and range 1 ***Graphs of Functions*** Graphical relations and functions Domain and range from graphs
Activity 28 *Comparing Functions* 28-1 Learning Targets:	***Comparing Linear Functions*** Comparing linear functions Comparing linear functions 1

• Represent functions algebraically, graphically, tabularly, or verbally. • Compare properties of two or more functions. 28-2 Learning Targets: • Compare properties of two or more functions, each represented in a different way. • Identify examples of proportional and nonproportional functions.	Comparing linear functions 2 Comparing linear functions 3
Activity 29 *Constructing Functions* 29-1 Learning Targets: • Construct a function to model a linear relationship between two quantities. • Graph functions that model linear relationships. 29-2 Learning Targets: • Determine the rate of change and initial value of a function. • Interpret the rate of change and initial value of a linear function in terms of the situation it models. • Identify examples of proportional and nonproportional functions that arise from mathematical and real-world problems.	***Constructing Functions***
Activity 30 *Linear Functions* 30-1 Learning Targets: • Model linear relationships between quantities using functions. • Identify and represent linear functions with tables, graphs, and equations. 30-2 Learning Targets: • Identify linear and non-linear functions from tables, graphs, and equations. • Graph a linear function from a verbal description. • Understand that y = mx + b defines a linear equation.	***Rate of Change*** Slope and rate of change
Activity 31 *Linear and Non-Linear Functions* 31-1 Learning Targets: • Determine if a function is linear or non-linear. • Represent functions with tables, graphs,	***Linear and Non-Linear Functions*** Recognizing linear functions Linear and nonlinear functions (example 1) Linear and nonlinear functions (example 2)

and equations. • Find a trend line to represent data. 31-2 Learning Targets: • Define, evaluate, and compare functions. • Recognize patterns in non-linear functions. • Represent functions with tables, graphs, and equations. 31-3 Learning Targets: • Recognize the relationship between verbal descriptions and graphs of linear and non-linear functions. • Use a trend line to make predictions.	Linear and nonlinear functions (example 3)
Unit 5: Probability and Statistics	
Activity 32 *Scatter Plots and Association* 32-1 Learning Targets: • Make a scatter plot. • Recognize patterns in scatter plots. 32-2 Learning Targets: • Recognize patterns in scatter plots. • Describe association between two numerical variables in terms of direction, form and strength.	***Scatter Plots*** Constructing a scatter plot
Activity 33 *Bivariate Data* 33-1 Learning Targets: • Collect bivariate data from an experiment. • Summarize bivariate data in a scatter plot. 33-2 Learning Targets: • Informally fit a line to bivariate data. • Use a trend line to make a prediction. 33-3 Learning Targets: • Interpret scatter plots. • Use a trend line to make predictions.	***Trend Lines*** Interpreting a trend line Estimating the line of best fit exercise
Activity 34 *Median-Median Line* 34-1 Learning Targets: • Determine if a linear model is a good fit for a scatter plot. • Find the median-median line for bivariate numerical data. 34-2 Learning Targets:	**N/A**

• Find the median-median line for bivariate numerical data. • Use the median-median line to make predictions.	
Activity 35 *Two-Way Tables and Association* 35-1 Learning Targets: • Analyze two-way tables and find relative frequencies. • Construct segmented bar graphs to display association. 35-2 Learning Targets: • Understand association between two categorical variables. • Describe association between two categorical variables.	***Two-Way Frequency Tables*** Two-way frequency tables and Venn diagrams Two-way relative frequency tables Interpreting two way tables ***Investigating Association*** Analyzing trends in categorical data
Unit 6: Personal Financial Literacy	
Activity 36 Managing Money	**N/A**