

**Course Title:** PCET

**Board Approval Date:** February 13, 2017

**Credit / Hours:** 0.5 Credit

**Reviewed Annually**

**Course Description:**

As the title of this course implies, it is designed for those college-bound students who plan to take the college boards. This course is aimed at preparing the student for the examination. The objective of PCET is twofold in that it is a review of high school mathematics, and it gives the student practice in taking tests of this nature.

\*Students will need a scientific calculator or a TI-89 graphing calculator for this course.

**Learning Activities / Modes of Assessment:**

Large group instruction

Checklists / Teacher Observation

Note-Taking

SAT practice via I-pad

Tests and Quizzes (Formative and Summative)

Small group work

Homework

**Instructional Resources:**

AMSCOS's *Preparing/or the New SAT(Mathematics); second edition*

[www.collegeboard.org](http://www.collegeboard.org)

Scientific Calculator (Ti-30/34 or higher)

## Course Pacing Guide

Course: **PCET Math**

**Course Unit (Topic)**

**Length of Instruction (Days/Periods)**

1. Heart of Algebra (Category I)	16 days
2. Problem Solving and Data Analysis (Category II)	23 days
3. Passport to Advanced Math (Category III)	25 days
4. Additional Topics in Math {Category IV}	16 days
5. Model Sat Tests (Pre, Middle, and Post)	10 days
DAYS TOTAL	90 days

## Know-Understand-Do

Course: PCET (mathematics)

Topic: Heart of Algebra (Category 1)

### Know

- Simplifying/Evaluating algebraic expressions
- Formulas and absolute value
- Representing relationships using algebraic language
- Finding equivalent expressions
- Creating and solving linear and absolute value equations/inequalities
- literal and absolute value equations
- Creating, evaluating and Interpreting linear functions
- Slope and parallel/perpendicular lines
- Solving systems of equations/Inequalities in two variables
- Direct and Inverse variation
- **XV-Plane**
- Distance and midpoint formulas
- Graphical representation

### Understand

- Solving SAT problems pertaining to representing relationships between quantities and creating algebraic expressions.
- Solving SAT problems pertaining to creating and solving linear and absolute value equations and inequalities.
- Solving SAT problems pertaining to Linear Functions
- Solving SAT problems pertaining to systems of equations and inequalities.
- Solving SAT problems pertaining to direct and inverse variation.
- Solving SAT problems pertaining to algebraic connections between linear equations and their graphical representations.

### DO

- **CC.2.2.HS.D.1:** Interpret the structure of expressions to represent a quantity in terms of its context.
- **CC.2.2.HS.D.2:** Write expressions in equivalent forms to solve problems.
- **C.C.2.2.HS.D.8:Apply** inverse operations to solve equations or formulas for a given variable.
- **CC.2.2.HS.D.9:** Use reasoning to solve equations and justify the solution method.
- **CC.2.2.HS.D.10:** Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.

# Student Learning Map

Days: 20

Course/Subject: PCET/Mathematics

Topic: Category 1: Heart of Algebra

Key Learning: Solve SAT type problems involving Algebra

Unit Essential Question: What are the key components for solving SAT problems involving Algebra?

Concept:  
Algebraic Expressions

Concept:  
Equations and inequalities

Concept:  
Linear Functions

Lesson Essential Questions:

- How do we solve SAT type problems pertaining to Algebraic expressions?

Lesson Essential Questions:

- How do we solve SAT type problems pertaining to linear equations and inequalities?

Lesson Essential Questions:

- How do we solve SAT type problems pertaining to linear functions?

Vocabulary:

- Algebraic expressions, absolute value

Vocabulary:

- Compound inequalities

Vocabulary:

- Function, domain, range,

Additional Information/Resources:

## Student Learning Map

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<u>Concept:</u> Systems	<u>Concept:</u> Variation	<u>Concept:</u> Graphical representations
<u>Lesson Essential Questions:</u> <ul style="list-style-type: none"><li>• How do we solve SAT type problems pertaining to systems?</li></ul>	<u>Lesson Essential Questions:</u> <ul style="list-style-type: none"><li>• How do we solve SAT type problems pertaining to direct and inverse variation?</li></ul>	<u>Lesson Essential Questions:</u> <ul style="list-style-type: none"><li>• How do we solve SAT type problems pertaining to graphical representations?</li></ul>
<u>Vocabulary:</u>	<u>Vocabulary:</u> <ul style="list-style-type: none"><li>• Constant of proportionality, inverse variation, direct variation</li></ul>	<u>Vocabulary:</u> <ul style="list-style-type: none"><li>• Coordinate plane, one-to-one</li></ul>

## Know-Understand-Do

Course: PCET {mathematics}

Topic: Problem Solving/Data Analysis {Category II}

Know	Understand	DO
<ul style="list-style-type: none"> <li>Ratios, proportions, percent</li> <li>Measurement, rates, density</li> <li>Linear and non-linear scatterplots</li> <li>Linear and exponential behavior</li> <li>Frequency and two-way tables</li> <li>Association and Independence</li> <li>Charts and graphs to represent data</li> <li>Measures of center and spread</li> <li>Population parameters</li> <li>Sample statistics</li> <li>Confidence level and Interval</li> <li>Margin of error</li> <li>Analyzing data collection methods</li> <li>Justifying conclusions</li> <li>Evaluating reports to make inferences</li> </ul>	<ul style="list-style-type: none"> <li>Solving SAT problems pertaining to ratios, proportions, rate, and percent.</li> <li>Solving SAT problems pertaining to measurement, unit rate, and Density problems</li> <li>Solving SAT problems pertaining to describing and interpreting Scatterplots</li> <li>Solving SAT problems pertaining to comparing linear growth and exponential growth</li> <li>Solving SAT problems pertaining to categorical data, conditional probability, and relative frequencies</li> <li>Solving SAT problems pertaining to measures and center of spread</li> <li>Solving SAT problems pertaining to making inferences about population parameters based on sample data.</li> <li>Solving SAT problems pertaining to data collection, justifying conclusions, and making inferences.</li> </ul>	<ul style="list-style-type: none"> <li><b>CC.2.4.HS.B.1:</b> Summarize, represent, and interpret <b>data</b> on a single count or measurement variable.</li> <li><b>CC.2.4.HS.B.2:</b> Summarize, represent, and interpret data on two categorical and quantitative variables.</li> <li><b>CC.2.4.HS.B.3:</b> Analyze linear models to make interpretations based on the data.</li> <li><b>CC.2.4.HS.B.S:</b> Make inferences and justify conclusions based on sample surveys, experiments, and observational studies.</li> <li><b>CC.2.4.HS.B.6:</b> Use the concepts of independence and conditional probability to interpret data.</li> </ul>

# Student Learning Map

Days: 25

Course/Subject: PCET/Mathematics

Topic: Category 2: Problem Solving/Data Analysis

Key Learning: Solve SAT type problems involving problem solving and data analysis.

Unit Essential Question: What are the key components for solving SAT problems involving problem solving and data analysis?

Concept:  
Ratios/Proportions/Percent

Concept:  
Measurement

Concept:  
scatterplots

Concept:  
Growth

Lesson Essential Questions:  
How do we solve SAT type problems pertaining to ratios, proportions, and percent?

Lesson Essential Questions:  
How do we solve SAT type problems pertaining to Measurement?

Lesson Essential Questions:  
How do we solve SAT type problems pertaining to scatterplots?

Lesson Essential Questions:  
How do we solve SAT problems pertaining to exponential and linear growth?

Vocabulary:  
Ratio, proportion, percent

Vocabulary:  
Unit rate, Density, scale model

Vocabulary:  
Linear correlation, line of best fit

Vocabulary:

Additional Information/Resources:

## Student Learning Map

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<u>Concept:</u> Data and Frequencies	<u>Concept:</u> Center and Spread	<u>Concept:</u> Sample and Population	<u>Concept:</u> Data Collection
<u>Lesson Essential Questions:</u> How do we solve SAT type problems pertaining to data and frequencies?	<u>Lesson Essential Questions:</u> How do we solve SAT type problems pertaining to center and spread?	<u>Lesson Essential Questions:</u> How do we solve SAT type problems pertaining to population parameters?	<u>Lesson Essential Questions:</u> How do we solve SAT type problems pertaining to data collection?
<u>Vocabulary:</u> Categorical variable, conditional probability, frequencies, association, independence.	<u>Vocabulary:</u> Mean, median, mode, range, standard deviation	<u>Vocabulary:</u> Population, census, sample, parameter, margin of error, confidence interval	<u>Vocabulary:</u> Survey, observational studies, random sample

## Know-Understand-Do

Course: | PCET (mathematics)

Topic: Passport to Advanced Math (Category III)

Know	Understand	DO
<ul style="list-style-type: none"> <li>Integer exponents and rules for operations</li> <li>Radicals and fractional exponents</li> <li>Operations on terms with radicals</li> <li>Simplifying rational expressions</li> <li>Adding/subtracting/multiplying polynomial expressions with rational coefficients</li> <li>Adding/subtracting/multiplying/dividing rational expressions.</li> <li>Solving radical and rational equations</li> <li>Solving quadratic equations</li> <li>Creating, analyzing, and Interpreting quadratic and exponential equations.</li> <li>End behavior of quadratic and exponential functions</li> <li>Relationships between zeros and factors of a polynomial function</li> <li>Graphic and algebraic solutions to quadratic-linear systems</li> <li>Solutions to higher order systems</li> <li>Transformations and composition of functions</li> </ul>	<ul style="list-style-type: none"> <li>Solving SAT problems pertaining to creating equivalent expressions involving rational exponents and radicals.</li> <li>Solving SAT problems pertaining to operating on polynomial and rational expressions</li> <li>Solving SAT problems pertaining to solving radical and rational equations.</li> <li>Solving SAT problems pertaining to creating, analyzing, interpreting, and solving nonlinear equations.</li> <li>Solving SAT problems pertaining to relationships between polynomial zeros and factors.</li> <li>Solving SAT problems pertaining to systems of equations involving higher order equations.</li> <li>Solving SAT problems pertaining to transformation and composition of functions.</li> </ul>	<ul style="list-style-type: none"> <li><b>CC.2.2.HS.D.3:</b> Extend the knowledge of arithmetic operations and apply to polynomials.</li> <li><b>CC.2.2.HS.D.4:</b> Understand the relationship between zeros and factors of polynomials to make generalizations about functions and their graphs.</li> <li><b>CC.2.2.HS.D.6:</b> Extend the knowledge of rational functions to rewrite in equivalent forms.</li> <li><b>CC.2.2.HS.D.9:</b> Use reasoning to solve equations and justify the solution method.</li> <li><b>CC.2.2.HS.C.4:</b> Interpret the effects transformations have on functions and find the Inverses of functions.</li> <li><b>CC.2.2.HS.C.5:</b> Construct and compare linear, quadratic, and exponential models to solve problems.</li> <li><b>CC.2.2.HS.C.6:</b> Interpret functions in terms of the situations they model.</li> <li><b>CC.2.1.HS.F.1:</b> Apply and extend the properties of exponents to solve problems with rational exponents.</li> <li><b>CC.2.1.HS.F.2:</b> Apply properties of rational and irrational numbers to solve real world or mathematics problems.</li> </ul>

# Student Learning Map

Days: 25

Course/Subject: PCET/Mathematics

Topic: Category 3: Advanced Math

Key Learning: Solve SAT type problems involving advanced mathematics.

Unit Essential Question: What are the key components for solving SAT problems involving advanced mathematics?

Concept:  
Radicals expressions

Concept:  
Polynomials and Rationals

Concept:  
Radical and Rational Equations

Lesson Essential Questions:

- How do we solve SAT type problems pertaining to rational exponents and radical expressions?

Lesson Essential Questions:

- How do we solve SAT type problems pertaining to polynomials and rational expressions?

Lesson Essential Questions:

- How do we solve SAT type problems pertaining to radical and rational equations?

Vocabulary:  
Base, exponent, power, radicals







Vocabulary:

Vocabulary:  
Radical equation, rational equation

Additional Information/Resources:

## Student Learning Map

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<u>Concept:</u> Nonlinear Equations	<u>Concept:</u> Nonlinear Behaviors	<u>Concept:</u> Higher-order systems	<u>Concept:</u> Transformation and Composition
			
<u>Lesson Essential Questions:</u> How do we solve SAT type problems pertaining to nonlinear equations?	<u>Lesson Essential Questions:</u> How do we solve SAT type problems pertaining to Nonlinear graphic behavior?	<u>Lesson Essential Questions:</u> How do we solve SAT type problems pertaining to systems of higher-order equations?	<u>Lesson Essential Questions:</u> How do we solve SAT type problems pertaining to the transformation and composition of functions?
			
<u>Vocabulary:</u> Quadratic equation	<u>Vocabulary:</u> Quadratic, parabola, vertex, axis of symmetry, roots, intercepts, discriminant	<u>Vocabulary:</u>	<u>Vocabulary:</u> Translations, composition

## Know-Understand-Do

Course: | PCET (mathematics)

Topic: | Additional Topics in Math (Category IV)

Know	Understand	DO
<ul style="list-style-type: none"> <li>• Surface <b>area</b> and volume of prisms and other shapes</li> <li>• Computations involving angles, lines, and triangles.</li> <li>• Determining lengths and angles for special right triangles</li> <li>• Computing polygon line lengths and angle measures</li> <li>• Circle vocabulary</li> <li>• Angles in a circle</li> <li>• Areas of sectors</li> <li>• Angles formed by tangents, secants, and chords</li> <li>• Lengths of chords, tangents, and secants</li> <li>• Intersection of circles</li> <li>• Application of trigonometric ratios</li> <li>• The Pythagorean Theorem</li> <li>• Degrees, radians, and arc lengths</li> <li>• The unit circle and trigonometric functions with radian measure</li> <li>• Circle definitions and equations</li> <li>• Simplification of imaginary monomial expressions</li> <li>• Arithmetic operations on complex numbers</li> </ul>	<ul style="list-style-type: none"> <li>• Solving SAT problems pertaining to using formulas to calculate length, area, and volume.</li> <li>• Solving SAT problems pertaining to applying concepts and theorems about lines, angles, triangles, and polygons.</li> <li>• Solving SAT problems pertaining to using circle theorems to find arc lengths, angle measures, chord lengths, and sector areas.</li> <li>• Solving SAT problems pertaining to derivation and application of trigonometric ratios, Pythagorean theorem, and solving right triangles.</li> <li>• Solving SAT problems pertaining to degree and radian measure, trigonometric functions, and the unit circle.</li> <li>• Solving SAT problems pertaining to circles in the coordinate plane.</li> <li>• Solving SAT problems pertaining to simplifying and performing arithmetic operations on complex numbers.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>CC.2.3.HS.A.4:</b> Verify and apply geometric theorems as they relate to geometric figures.</li> <li>• <b>CC.2.3.HS.A.7:</b> Apply trigonometric ratios to solve problems involving right triangles.</li> <li>• <b>CC.2.3.HS.A.8:</b> Apply geometric theorems to verify properties of circles.</li> <li>• <b>CC.2.3.HS.A.9:</b> Extend the concept of similarity to determine arc lengths and area of sectors of circles.</li> <li>• <b>CC.2.3.HS.A.12:</b> Explain volume formulas and use them to solve problems.</li> <li>• <b>CC.2.3.HS.A.13:</b> Analyze relationships between two-dimensional and three-dimensional objects.</li> <li>• <b>CC.2.3.HS.A.14:</b> Apply geometric concepts to model and solve real world problems.</li> <li>• <b>CC.2.2.HS.C.7:</b> Apply radian measure of an angle and the unit circle to analyze the trigonometric functions.</li> <li>• <b>CC.2.2.HS.C.9:</b> Prove Pythagorean identity and use it to calculate trigonometric ratios.</li> <li>• <b>CC.2.1.HS.F.6:</b> Extend the knowledge of arithmetic operations and apply to complex numbers.</li> </ul>

# Student Learning Map

Days: 15

Course/Subject: PCET/Mathematics

Topic: Category 4: Additional Topics in Math

Key Learning: Solve SAT type problems involving geometry and trigonometry.

Unit Essential Question: What are the key components for solving SAT problems involving geometry and trigonometry?

Concept:  
Area and Volume

Concept:  
Triangles and other Polygons

Concept:  
Circles

Lesson Essential Questions:  
How do we solve SAT type problems pertaining to area and volume?

Lesson Essential Questions:  
How do we solve SAT type problems pertaining to triangles and polygons?

Lesson Essential Questions:  
How do we solve SAT type problems pertaining to circles?

Vocabulary:  
• Area, volume

Vocabulary:  
• Special right triangles, regular polygon

Vocabulary:  
• Chord, diameter, radius, arc, sector, secant, tangent

Additional Information/Resources:

## Student Learning Map

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<u>Concept:</u> Right Triangles	<u>Concept:</u> Circles in the Coordinate Plane	<u>Concept:</u> Complex numbers
<u>Lesson Essential Questions:</u> How do we solve SAT type problems pertaining to right triangles?	<u>Lesson Essential Questions:</u> How do we solve SAT type problems pertaining to circles in the coordinate plane?	<u>Lesson Essential Questions:</u> How do we solve SAT type problems pertaining to complex numbers?
<u>Vocabulary:</u> Pythagorean Theorem, Trig ratios, sine, cosine, tangent	<u>Vocabulary:</u>	<u>Vocabulary:</u> Imaginary numbers, conjugate