TOWNSHIP OF UNION PUBLIC SCHOOLS

College Study Skills (Mathematics Portion)

Curriculum Guide 2015

Curriculum Guide Approved June 2015

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Sherri Horn—Mathematics teacher, UHS

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District Mission Statement

The Township of Union Board of Education believes that every child is entitled to an education, designed to meet his or her individual needs, in an environment that is conducive to learning. State standards, federal and state mandates, and local goals and objectives, along with community input, must be reviewed and evaluated on a regular basis to ensure that an atmosphere of learning is both encouraged and implemented. Furthermore, any disruption to or interference with a healthy and safe educational environment must be addressed, corrected, or, when necessary, removed, in order for the district to maintain the appropriate educational setting.

District Philosophy Statement

The Township of Union Public School District, as a societal agency, reflects democratic ideals and concepts through its educational practices. It is the belief of the Board of Education that a primary function of the Township of Union Public School System is the formulation of a learning climate conducive to the needs of all students in general, providing therein for individual differences. The school operates as a partner with the home and community.

Statement of District Goals

- Develop reading, writing, speaking, listening, and mathematical skills.
- Develop a pride in work and a feeling of self-worth, self-reliance, and self discipline.
- Acquire and use the skills and habits involved in critical and constructive thinking.
- Develop a code of behavior based on moral and ethical principals.
- To be able to work with others cooperatively.
- Acquire a knowledge and appreciation of the historical record of human achievement and failures and current societal issues.
- Acquire a knowledge and understanding of the physical and biological sciences.
- Efficient and effective participation in economic life and the development of skills to enter a specific field of work.
- Appreciate and understand literature, art, music, and other cultural activities.
- Develop an understanding of the historical and cultural heritage.
- Develop a concern for the proper use and/or preservation of natural resources.
- Develop basic skills in sports and other forms of recreation.

Course Description

This course is test preparation for the mathematics section of the SAT test, used as an admissions requirement by some colleges and universities. The class content has been designed for students wishing to eventually attend a four-year post secondary institution. Students should ideally come into the class having had completed algebra 1 and geometry with a C or better, and currently enrolled in algebra 2 or higher. While numerical, algebraic, geometric, functional analysis and statistical concepts will be highlighted and reviewed, the student is expected to have a certain level of mastery in order to be able to apply this knowledge to the answering of SAT type questions. The course's primary focus is to develop techniques and confidence in reading, interpreting, modeling, answering and checking reasonability of answers to SAT type questions. Real questions from past SAT examinations will be completed and analyzed. By the end of the school year it is hoped that the student's ability to recognize and solve the most frequently asked questions will enhance both accuracy and speed.

Recommended Textbooks

The Official SAT Study Guide by THE College Board, New York
SAT questions from the College Board website

Course Proficiencies

Students will be able to:

Use properties of integers, fractions, exponents, and radicals to simplify expressions
Identify factors, multiples, remainders and prime numbers
Correctly order real numbers on a number line
Solve ratio and percent problems
Identify sequences
Find the union and intersection of sets
Use the fundamental counting principle, combinations and permutations
Isolate a variable in an equation and inequality
Factor binomials and trinomials
Use properties of exponents
Understand exponential growth and decay
Find the range of answers for an absolute value equation
Solve systems of equations
Use direct and inverse variation when appropriate
Know graphical behavior of linear and quadratic functions
Utilize properties of quadrilaterals and other polygons
Use area and perimeter formulas of parallelograms and triangles
Find slope, distance and midpoint of two points
Use similarity and congruence

Use properties of right, equilateral and isosceles triangles
Calculate mode, mean, median and weighted average
Calculate algebraic and geometric probability
Increase test taking skills

Curriculum Units
Numbers & Operations, Algebra & Functions, Geometry, Data Analysis & Statistics& Probability, Test Strategies

Unit 1 (Numbers & Operations)

#	STUDENT LEARNING OBJECTIVES	CORRESPONDING CCSS
1	Find LCM and GCF	
2	Identify the results of operations on even, odd, positive and negative numbers	
3	Utilize properties of additive and multiplicative inverses	
4	Find consecutive integers and consecutive multiples totaling to a given number	N-RN
5	Put all types of real numbers in numerical order	
6	Solve direct and inverse variations, involving changing of units	N-Q

Major Content Supporting Content **Additional Content** (Identified by PARCC Model Content Frameworks).

Bold type indicates grade level fluency requirements. *(Identified by PARCC Model Content Frameworks).*

Selected Opportunities for Connection to Mathematical Practices
1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.

6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

All of the content presented at this grade level has connections to the standards for mathematical practices.

Bold type identifies possible starting points for connections to the SLOs in this unit.

Code #	Common Core State Standards
N-RN	Extend the properties of exponents to rational exponents
N-Q	Reason quantitatively and use units to solve problems

Major Content Supporting Content **Additional Content** (Identified by PARCC Model Content Frameworks).

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CCSS #	Assessments
N-RN	Solve equations with rational exponents
N-Q	Find a number given a set of specifications
	Identify patterns
	Solve problems with a given remainder

Unit 2 (Algebra&Functions)

#	STUDENT LEARNING OBJECTIVES	CORRESPONDING CCSS
1	Use factoring to solve a quadratic equation	FIF 8a
2	Solve for one variable in terms of another	A-REI 3
3	Solve systems of equations	A-REI 6
4	Identify transformations of a graph	FBF 3
5	Identify the parts of an exponential equation	F-LFC
6	Utilize function notation	F-IF 2

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Code #	Common Core State Standards
F.IF.8a	Use the process of factoring to show zeros, line of symmetry, and vertex of a parabola
A-REI.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters
A-REI.6	Solve system of linear equations exactly and approximately (with graphs)
F-IF.2	Use function notation, evaluate function with inputs, and interpret statements that use function notation
F.BF.3	Identify the effects on graphs by replacing values

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CCSS #	Assessments
F.IF.8a	Use calculators as appropriate to analyze graphs
A-REI.3	Use equations to solve distance, average, and percent of increase problems
A-REI.6	Create a system of equations from a word problem involving 2 unknowns
F-LEC	Find the missing value in an exponential model
F.BF.3	Connect parts of graphs with appropriate slopes

Unit 3 (Geometry)

#	STUDENT LEARNING OBJECTIVES	CORRESPONDING CCSS
1	Find the missing side of a triangle exactly or within a range by Pythagorean theorem, triples or third side theorem	G-SRT 8
2	Make proportional comparisons between arc length to circumference, area of sector to area and central angle to 360 degrees	G-C5
3	Use volume, area, and perimeter formulas	G-GMD
4	Use sum of interior angles of a polygon	G-CO 10
5	Recognize when congruent sides lead to congruent angles and vise versa	G-CO 11
6	Use properties of parallelograms and transversals	G-CO 9,11

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Code #	Common Core State Standards
G-SRT 8	Use trig ratios and Pythagorean Theorem
G-C5	Find arc lengths and area of sectors
G-GMD	Explain volume formulas and use them to solve problems
G-CO 9	Prove theorems about lines and angles
GCO 11	Prove theorems about parallelograms

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CCSS #	Assessments
G-SRT 8	Demo how putting a problem on a coordinate plane couldhelp find measurements
G-C5	Derive the formula for area of a sector
G-GMO	Demo difference between surface area and volume
G-CO 10	Demo how the segment joining midpoints in a triangle is parallel to the third side and half its length
G-CO 9	Demo the right angle formed by a radius and tangent
G-CO 11	Discuss relationship between diagonal and diameter in circumscribed figures

Unit 4 (Data Analysis,Statistics,Probability)

#	STUDENT LEARNING OBJECTIVES	CORRESPONDING CCSS
1	Read circle, bar, line and pictographs	SID 1
2	Find mean, mode, median	SID 2
3	Identify combinations and permutations	S-CP 9
4	Find probability of independent and dependent events	S-CP 3
5	Compute geometric probability on circles and rectangles	
6	Use Venn diagrams to demo intersections and unions	

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Selected Opportunities for Connection to Mathematical Practices
1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning. *All of the content presented at this grade level has connections to the standards for mathematical practices.*

Bold type identifies possible starting points for connections to the SLOs in this unit.

Code #	Common Core State Standards
SID 1	Represent data with plots
SID 2	Use appropriate statistics
S-CP 9	Use permutations and combinations to complete problems
S-CP 3	Understand conditional problems

Major Content Supporting Content **Additional Content** (Identified by PARCC Model Content Frameworks).

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CCSS #	Assessments
SID 1	Find largest percent of change in a graph, whether higher or lower
SID 2	Determine the affect on measures of central tendency given data changes
S-CP 9	Recognize when a list is better than a formula
S-CP 3	Recognize when fractional probabilities are given they must total to 1

Unit 5 (Test Strategies)

#	STUDENT LEARNING OBJECTIVES	CORRESPONDING CCSS
1	Recognize how to plug in the correct numbers into an expression with a newly defined symbol	
2	Locate and remember to use the formula page	
3	Understand the difference between scoring a multiple choice and open-ended	
4	Utilize technique of plugging in real numbers to find the correct answer to a variable problem	
5	Recognize when the multiple choice answers will aid in finding the solution	
6	Recognize when a problem can be solved backwards	

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Pacing Guide

The course is not broken into days by topic. All proficiencies are reviewed or practiced as they arise within the context of a given problem. Class periods spend first and third marking periods in English or Math and second and fourth periods in the other discipline.