Randolph Township Schools
Randolph High School

Academic Review Math 9

"Mathematics is the art of giving the same name to different things."

- Henri Poincare

STEM DEPARTMENT

Curriculum Committee
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July 2018

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September 4th, 2018

Randolph Township Schools
Department of Science, Technology, Engineering, and Mathematics
Academic Review Math 9

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Randolph Township Schools

Mission Statement

We commit to inspiring and empowering all students in Randolph schools to reach their full potential as unique, responsible and educated members of a global society.

Randolph Township Schools
Affirmative Action Statement

Equality and Equity in Curriculum

The Randolph Township School district ensures that the district's curriculum and instruction are aligned to the state's standards. The curriculum provides equity in instruction, educational programs and provides all students the opportunity to interact positively with others regardless of race, creed, color, national origin, ancestry, age, marital status, affectional or sexual orientation, gender, religion, disability or socioeconomic status.

N.J.A.C. 6A:7-1.7(b): Section 504, Rehabilitation Act of 1973; N.J.S.A. 10:5; Title IX, Education Amendments of 1972

RANDOLPH TOWNSHIP BOARD OF EDUCATION
EDUCATIONAL GOALS
VALUES IN EDUCATION

The statements represent the beliefs and values regarding our educational system. Education is the key to self-actualization, which is realized through achievement and self-respect. We believe our entire system must not only represent these values, but also demonstrate them in all that we do as a school system.

We believe:

- The needs of the child come first
- Mutual respect and trust are the cornerstones of a learning community
- The learning community consists of students, educators, parents, administrators, educational support personnel, the community and Board of Education members
- A successful learning community communicates honestly and openly in a non-threatening environment
- Members of our learning community have different needs at different times. There is openness to the challenge of meeting those needs in professional and supportive ways
- Assessment of professionals (i.e., educators, administrators and educational support personnel) is a dynamic process that requires review and revision based on evolving research, practices and experiences
- Development of desired capabilities comes in stages and is achieved through hard work, reflection and ongoing growth

Randolph Township Schools
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Academic Review Math 9

Course Introduction

In this course, individualized and small group instruction will be given to students based upon MAP Diagnostic testing. The purpose of this course is to strengthen the skills necessary to succeed in current and upcoming math classes. These foundational skills include number sense, algebraic thinking, proportional reasoning and problem solving. As this course is driven by individual needs, instruction will be self-paced and reflect the needs of the learner. Data from the Khan Academy online modules will be used as formative assessment to drive teacher guided lessons where necessary. An additional focus will be geared toward creating a growth mindset to further empower individuals as 21st century learners ready to take on the challenge of future classes.

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Curriculum Pacing Chart
Academic Review Math 9

SUGGESTED TIME ALLOTMENT	UNIT NUMBER	CONTENT - UNIT OF STUDY
Ongoing	**I**	**The Real Number System**
Ongoing	**II**	**Algebraic Thinking**
Ongoing	**III**	**Percents and Proportions**

18 weeks is the average

* Since the course is tailored to individual student needs, the pacing chart is flexible. Additionally, the program may revisit content and units of study throughout the year.

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Academic Review Math 9
UNIT I: The Real Number System

TRANSFER: Students will be able to strengthen their conceptual understanding of the real number system, including positive and negative numbers, fractions and decimals, and apply this conceptual understanding to solving equations, graphing functions, and modeling real-world scenarios.

<table>
<tr><td rowspan="5">STANDARDS / GOALS:

5.NF.B.3: Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem.

6.NS.A.1: Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.

6.NS.B: Compute fluently with multi-digit numbers and find common factors and multiples.</td><td>ENDURING UNDERSTANDINGS</td><td>ESSENTIAL QUESTIONS</td></tr>
<tr><td>Real numbers allow us to communicate in our world.</td><td>• How does knowledge of real numbers help in solving problems that you encounter in your life?</td></tr>
<tr><td>The representation of a number or expression can be dependent on the situation or context.</td><td>• How does representing numbers in different ways influence your decision making?</td></tr>
<tr><td>KNOWLEDGE</td><td>SKILLS</td></tr>
<tr><td>Students will know:

The sum, difference, product, or quotient can be found given any two numbers in the real number system.</td><td>Students will be able to:

Apply multiple operations to rational numbers, including combinations of positive or negative fractions, decimals, and integers.

Model division with whole numbers, fractions, and mixed numbers, giving results in simplest form.</td></tr>
</table>

6.NS.C.6c: Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane. 6.NS.C.7: Understand ordering and absolute value of rational numbers. 7.NS.A: Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. 7.NS.A.1c: Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference and apply this principle in real-world contexts. 7.NS.A.2a: Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed	Multiple ways exist to represent and compare numbers. Real world situations can be modeled using numbers and equations. **VOCABULARY:** rational number, least common denominator, least common multiple, numerator, denominator, absolute value, sum, difference, quotient, product, Cartesian Plane/coordinate grid, quadrant	Understand fractions as the division of the numerator by the denominator. Determine least common multiples and rewrite the sum of two whole numbers as a product of a common factor and the sum of two whole numbers. Identify and plot all forms of rational numbers (positive & negative fractions, decimals, mixed numbers) on a number line. Determine the coordinates of and plot points in all four quadrants of a Cartesian Plane. Evaluate and order the absolute value of rational numbers. Evaluate and order expressions containing absolute value. Solve one-step word problems involving various operations with fractions, mixed numbers, and whole numbers.

numbers. Interpret products of rational numbers by describing real-world contexts.		

ASSESSMENT EVIDENCE: Students will show their learning by:

- Compiling a portfolio of their weekly work.
- Self-assessing their progress through self-evaluation tools such as rubrics.
- Teacher evaluation of Khan Academy progress.
- Supplemental formative assessment such as Do Now, Exit Ticket, etc. where appropriate.

KEY LEARNING EVENTS AND INSTRUCTION:

- Students will complete individualized Khan Academy online modules based on MAP diagnostic.
- Supplemental lessons and small group instruction where necessary.
- Use of physical and virtual manipulatives as needed.

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Academic Review Math 9
UNIT I: The Real Number System

SUGGESTED TIME ALLOTMENT	CONTENT-UNIT OF STUDY	SUPPLEMENTAL UNIT RESOURCES
Ongoing	**Unit I: The Real Number System** • Integers • Fractions • Representations of numbers including modeling and graphing	Khan Academy https://www.khanacademy.org/mappers Jo Boaler: Growth Mindset https://www.youcubed.org/resource/ted-talks/ NCTM Illuminations https://illuminations.nctm.org National Library of Virtual Manipulatives http://nlvm.usu.edu Building Powerful Numeracy for Middle and High School Students by Pamela Weber Harris (www.heinemann.com) Student resource worksheets http://www.kutasoftware.com Albert.io https://www.albert.io/math/algebra Uncomplicating Fractions to Meet Common Core Standards in Math, K-7 by Marian Small (www.nctm.org 2014) Problem Attic Online Resource http://www.problem-attic.com

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Academic Review Math 9
Unit II: Algebraic Thinking

TRANSFER: Students will be able to apply patterned reasoning to build their conceptual understanding of properties of exponents and operations with linear expressions in preparation for more advanced Algebraic topics of factoring and performing operations with polynomials.

STANDARDS / GOALS:	**ENDURING UNDERSTANDINGS**	**ESSENTIAL QUESTIONS**
6.EE.A.2a: Write expressions that record operations with numbers and with letters standing for numbers. 6.EE.A.2b: Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. 6.EE.A.2c: Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).	Relationships can be described in a variety of forms by using foundational skills of mathematics.	• In what ways can we use operations to simplify expressions?
	Mathematical strategies can be employed to evaluate practical situations.	• What is algebraic thinking and how does it help us to solve real-world problems? • How can we analyze whether the mathematical solution is the most appropriate for the given situation?
	KNOWLEDGE	**SKILLS**
	Students will know: Proper representation and use of algebraic expressions and formulas.	**Students will be able to:** Translate between verbal and algebraic expressions. Identify and write algebraic expressions from a mathematical description of its component parts, including sum, product, quotient, term, and coefficient.

7.EE.A.1: Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. 7.EE.B.3: Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. 7.EE.B.4b: Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. 8.EE.C.7b: Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.	The benefits of using equations to model real-world problems. Methods of properly evaluating exponents involving negatives.	Evaluate formulas, equations, linear and nonlinear expressions using rational numbers for given variables. Generate equivalent linear expressions by combining like terms. Apply the order of operations, with grouping symbols to simplify numerical expressions involving both positive and negative rational numbers. Solve real-world problems using appropriate problem-solving strategies and evaluates the reasonableness of the solutions. Write and solve one-, two-, and multi-step linear equations with rational numbers and apply to real-world problems. Represent and interpret solutions to equations and inequalities. Evaluate numbers with negative integer bases and whole-number exponents. Use properties of exponents to simplify numerical expressions involving negative integer exponents, including zero.

8.EE.A.1: Know and apply the properties of integer exponents to generate equivalent numerical expressions.	**VOCABULARY:** variable, expression, numerical expression/algebraic expression, exponent, base, power, linear, nonlinear, inequality, equivalent, distributive property, solution	

ASSESSMENT EVIDENCE: Students will show their learning by:

- Compiling a portfolio of their weekly work.
- Self-assessing their progress through self-evaluation tools such as rubrics.
- Teacher evaluation of Khan Academy progress.
- Supplemental formative assessment such as Do Now, Exit Ticket, etc. where appropriate.

KEY LEARNING EVENTS AND INSTRUCTION:

- Students will complete individualized Khan Academy online modules based on MAP diagnostic.
- Supplemental lessons and small group instruction where necessary.
- Use of physical and virtual manipulatives as needed.

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Academic Review Math 9
Unit II: Algebraic Thinking

SUGGESTED TIME ALLOTMENT	CONTENT-UNIT OF STUDY	SUPPLEMENTAL UNIT RESOURCES
Ongoing	**Unit II: Algebraic Thinking** • Algebraic Expressions, Equations, and Inequalities • Order of Operations • Exponents • Real World Applications	Khan Academy https://www.khanacademy.org/mappers Jo Boaler: Growth Mindset https://www.youcubed.org/resource/ted-talks/ NCTM Illuminations https://illuminations.nctm.org National Library of Virtual Manipulatives http://nlvm.usu.edu Building Powerful Numeracy for Middle and High School Students by Pamela Weber Harris (www.heinemann.com) Student resource worksheets http://www.kutasoftware.com Albert.io https://www.albert.io/math/algebra Problem Attic Online Resource http://www.problem-attic.com

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Academic Review Math 9
UNIT III: Proportions and Percents

TRANSFER: Students will be able to build their conceptual understanding of ratio and proportion, laying the foundation for future work in simplifying rational expressions and graphing rational functions in mathematics as well as percent increase and percent error in chemistry.

STANDARDS / GOALS:	**ENDURING UNDERSTANDINGS**	**ESSENTIAL QUESTIONS**
6.RP.A.3a: Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. 6.RP.A.3c: Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent. 7.RP.A.2: Recognize and represent proportional relationships between quantities. 7.RP.A.2c: Represent proportional relationships by equations.	Percentages give perspective on comparisons in various settings.	• Where do we find percentages useful for understanding data in our lives?
	Proportional reasoning involves making comparisons of quantities or values.	• What does it mean for two quantities to be proportional?
	KNOWLEDGE	**SKILLS**
	Students will know: Rules and applications of percentages. Proportional reasoning can be applied to important real-world problems.	**Students will be able to:** Calculate the percent, part or total based on information given. Estimate and calculate the percent one number is of another number for percents greater than 100% and less that 1%. Solve one- and multi-step percent problems within a real-world or mathematical context.

7.RP.A.3: Use proportional relationships to solve multistep ratio and percent problems.	**VOCABULARY:** part, total, percent, ratio, proportion, cross multiplication, equivalent fractions	Solve for a missing value in a proportion by reasoning with equivalent fractions and/or taking a cross product. Interpret and solve a word problem using ratios and proportional reasoning. Determine reasonableness of mathematical solution in real world context.

ASSESSMENT EVIDENCE: Students will show their learning by:

- Compiling a portfolio of their weekly work.
- Self-assessing their progress through self-evaluation tools such as rubrics.
- Teacher evaluation of Khan Academy progress.
- Supplemental formative assessment such as Do Now, Exit Ticket, etc. where appropriate.

KEY LEARNING EVENTS AND INSTRUCTION:

- Students will complete individualized Khan Academy online modules based on MAP diagnostic.
- Supplemental lessons and small group instruction where necessary.
- Use of physical and virtual manipulatives as needed.

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Academic Review Math 9
UNIT III: Proportions and Percents

SUGGESTED TIME ALLOTMENT	CONTENT-UNIT OF STUDY	SUPPLEMENTAL UNIT RESOURCES
Ongoing	**Unit III: Proportions and Percents** • Percents • Applications of Percents • Proportions • Application of Proportions	*AMP. From Percentages to Algebra* Khan Academy https://www.khanacademy.org/mappers Jo Boaler: Growth Mindset https://www.youcubed.org/resource/ted-talks/ NCTM Illuminations https://illuminations.nctm.org National Library of Virtual Manipulatives http://nlvm.usu.edu Building Powerful Numeracy for Middle and High School Students by Pamela Weber Harris (www.heinemann.com) Student resource worksheets http://www.kutasoftware.com Albert.io https://www.albert.io/math/algebra Problem Attic Online Resource http://www.problem-attic.com

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APPENDIX A

Suggested Evaluation Tools:

Student Participation Self-Evaluation Rubric:

MATH ACADEMIC REVIEW 9 RUBRIC **NAME** _____ **PERIOD** _____

COLUMN A: Expectations	1= Needs Improvement	2=Developing	3=Adequate	4=Highly Effective
USE OF TIME • Productive from start to end of period • Student prioritizes and focusses on accomplishing tasks • Self-directs and manages their time efficiently	Misuse of class time for non-academic related activities. Distracted. Off task. Possibly distractive to others.	Using class time productively some of the time. Self-prioritizing and managing *needs improvement*.	Generally, uses class time well. Occasionally distracted or off topic. Ability to self-manage is apparent.	See column A.
TASK COMPLETION • Specific work gets accomplished • Demonstrable targeted study • Assigned tasks are completed in a timely manner	Assigned tasks are not being completed. Priorities not established and / or accomplished.	Minimal tasks completed-not performing to their ability level. Quality of work needs improvement	Student gets tasks accomplished. Effort is occasionally inconsistent, but fulfills requirements of tasks.	See column A.
COMMUNICATION • Clearly communicates needs (time, resources, etc.) • Informing teacher of progress • Seeks clarity or direction when needed • Assists others with remaining on task	Lack of or poor communication (work and needs), verbally or otherwise. Listening and speaking needs improvement	Provides and seeks minimal information; struggles to communicate effectively with teacher. Observed communication lacking or off topic.	Oft Communicates needs. Inconsistent listening and speaking skills, but generally, seeks information or guidance when needed.	See column A.

TOTAL:

Student Skill Self-Evaluation Rubric:

MY SELF ASSESSMENT				
1 = BEGINNING TO "GET IT"				
2 = THE SKILL IS STARTING TO MAKE MORE SENSE AFTER I HAVE PRACTICE IT	Shade the level that YOU believe you are currently working at:			
3 = I AM IN THE "GROOVE" AND UNDERSTAND ABOUT 80% OF WHAT I NEED TO DO				
4 =I GOT THIS AND COULD TEACH IT TO SOMEONE ELSE	1	2	3	4
(STUDENT NAME) is ready to DEVELOP these skills (231-240):				
EXPRESSIONS				
Evaluates linear expressions at given values with variables involving negative rational numbers				
Evaluates nonlinear expressions at given values with variables involving negative rational numbers				
Interprets the coefficient and constant in a linear expression within the context of a real-world relationship				
Translates between verbal and algebraic expressions				
Writes algebraic expressions from a mathematical description of its component parts, including sum, product, quotient, term, and coefficient				
Inequalities				
Writes a linear inequality in two variables to represent a real-world or mathematical context				
Writes a one-step linear inequality in one variable to represent a real-world or mathematical context				
Writes a two-step linear inequality in one variable to represent a real-world or mathematical context				
Number Sentences/Equations/Equivalence				
Solves one-step linear equations with positive rational numbers				
Writes a multi-step linear equation in one variable to represent a real-world or mathematical context				
Writes and solves a multi-step quadratic equation in one variable involving a real-world or mathematical context				
Writes and solves a two-step linear equation in one variable involving a real-world				

Suggested Student Checklist for Academic Review Portfolio:

STUDENT NAME _____

Check list: As you put any piece into your portfolio, please make sure it is indicated on these cover sheets.

Reflection Paragraph from the Jo Boaler's Growth Mindset videos

_____Knocking Down the Myths About Math

_____ Math and Mindset

_____ Mistakes and Speed

_____ Number Flexibility, Mathematical Reasoning, and Connections

_____ Number Patterns and Representations

_____ Math in Life, Nature and Work

Student Chosen Portfolio piece each week (minimum of 1/ max of 3 per week)
(15 out of the 18 weeks must be completed)

DATE

_____ Week # ___ _____/____ Topic _____

_____ Week # ___ _____/____ Topic _____

_____ Week # ___ _____/____ Topic _____

_____ Week # ___ _____/____ Topic _____

Suggested Student Portfolio Rubric Weeks 1-9:

Student Name: _____

CATEGORY	4	3	2	1
Neatness and Organization	The work is presented in a neat, clear, organized fashion that is easy to read.	The work is presented in a neat and organized fashion that is usually easy to read.	The work is presented in an organized fashion but may be hard to read at times.	The work appears sloppy and unorganized. It is hard to know what information goes together.
Mathematical Concepts	Explanation shows complete understanding of the mathematical concepts used to solve the problem(s).	Explanation shows substantial understanding of the mathematical concepts used to solve the problem(s).	Explanation shows some understanding of the mathematical concepts needed to solve the problem(s).	Explanation shows very limited understanding of the underlying concepts needed to solve the problem(s) OR is not written.
Mathematical Terminology and Notation	Correct terminology and notation are always used, making it easy to understand what was done.	Correct terminology and notation are usually used, making it fairly easy to understand what was done.	Correct terminology and notation are used, but it is sometimes not easy to understand what was done.	There is little use, or a lot of inappropriate use, of terminology and notation.
Explanation	Explanation is detailed and clear.	Explanation is clear.	Explanation is a little difficult to understand, but includes critical components.	Explanation is difficult to understand and is missing several components OR was not included.
Mathematical Errors	80-100% of the steps and solutions have no mathematical errors.	70-79% of the steps and solutions have no mathematical errors.	60-69 % of the steps and solutions have no mathematical errors.	More than 59% of the steps and solutions have mathematical errors.

Suggested Student Portfolio Rubric Weeks 10-18:

Student Name: _____

CATEGORY	4	3	2	1
Neatness and Organization	The work is presented in a neat, clear, organized fashion that is easy to read.	The work is presented in a neat and organized fashion that is usually easy to read.	The work is presented in an organized fashion but may be hard to read at times.	The work appears sloppy and unorganized. It is hard to know what information goes together.
Mathematical Concepts	Explanation shows complete understanding of the mathematical concepts used to solve the problem(s).	Explanation shows substantial understanding of the mathematical concepts used to solve the problem(s).	Explanation shows some understanding of the mathematical concepts needed to solve the problem(s).	Explanation shows very limited understanding of the underlying concepts needed to solve the problem(s) OR is not written.
Mathematical Terminology and Notation	Correct terminology and notation are always used, making it easy to understand what was done.	Correct terminology and notation are usually used, making it fairly easy to understand what was done.	Correct terminology and notation are used, but it is sometimes not easy to understand what was done.	There is little use, or a lot of inappropriate use, of terminology and notation.
Strategy/Procedures	Typically, uses an efficient and effective strategy to solve the problem(s).	Typically, uses an effective strategy to solve the problem(s).	Sometimes uses an effective strategy to solve problems, but does not do it consistently.	Rarely uses an effective strategy to solve problems.
Explanation	Explantion is clear and detailed.	Explanation is clear.	Explanation is a little difficult to understand, but includes critical components.	difficult to understand and is missing several components OR was not included.
Checking	The work has been checked by two classmates and all appropriate corrections made.	The work has been checked by one classmate and all appropriate corrections made.	Work has been checked by one classmate but some corrections were not made.	Work was not checked by classmate OR no corrections were made based on feedback.
Mathematical Errors	90-100% of the steps and solutions have no mathematical errors.	Almost all (85-89%) of the steps and solutions have no mathematical errors.	Most (75-84%) of the steps and solutions have no mathematical errors.	More than 75% of the steps and solutions have mathematical errors.

Suggested Portfolio Rubric for Overall Completion:

Academic Review Grade 9
Completion of Overall Portfolio Aseessment Rubric

NAME _____

Student reviewed on _____

Teacher reviewed on _____

Conference Date _____

	4	3	2	1
Completion Growth Mindset reflections	All 6 are completed	5 entries are completed	4 entries are completed	3 or less entries are completed
Completion weekly work entries into the portfolio	14 - 15 samples are submitted.	12 - 13 samples are submitted	10 - 11 samples are submitted	less than 9 samples are submitted

Comments:

RANDOLPH TOWNSHIP SCHOOL DISTRICT
Academic Review Math 9

APPENDIX B
Sample Questions:

The following are taken from the Growth Mindset course by Jo Boaler and will serve as reflection questions for the portfolio.

Source: https://www.youcubed.org/online-student-course/

Lesson 1

- Why do you think people often don't like math?
- Write down the main messages you learned in lesson 1 for someone of your age. What are 3 important things you learned today that everyone your age should know? Write a paragraph please.

Lesson 2

- What are some important things you learned today that everyone your age should know? Write a paragraph, please.

Lesson 3

- What are some important things you learned today about mistakes, struggle, and speed that everyone your age should know? Write a paragraph, please.

Lesson 4

- Why do you think that the students who worked on math together did so well in their math class afterwards?
- In this session we have learned about number flexibility, talking, reasoning and mathematical connections.
- Write about some of these important ideas for someone of your own age. In a paragraph explain to them why these ideas are important for their learning.

Lesson 5

- What are two big ideas in the learning of fractions?
- In this session we have talked about making sense, drawing and representing, using intuition, and looking for the big idea.
- What are some important things you learned today that everyone your age should know? Write a paragraph, please.

Lesson 6

- What other cool examples of math in the world can you think of?

Possible problem solving questions for use within the portfolio:

When Lilly's softball team visited Mexico, $1 in American money could be exchanged for 2702.2 pesos. If Lilly exchanged $25 in American money, about how many pesos did she receive?

a) What is the opposite of 8? Explain your thinking.

b) Explain if $-(-8)$ and $-|-8|$ result in the same value.

The value of b is a distance of 7 units from 4. What are the possible values of b? Explain how you determined the values for b. Use a number line, pictures, and/or words to help explain your reasoning.

Much of the earth's surface is covered with water. The table below shows the fractions of the earth's surface that are covered by oceans and other bodies of water. What fraction of the earth's surface is covered by land?

Part of Earth's Surface	Approximate Fraction of Earth's Surface
Pacific Ocean	$\frac{1}{4}$
Atlantic Ocean	$\frac{1}{8}$
Other oceans, lakes, rivers	$\frac{3}{8}$
Land	?

a) Using any mathematical language, describe how you would solve this problem. If it helps, describe your strategy in steps.

b) Compare the total amount of water (oceans, lakes, rivers) to the total amount of land found on earth. Which total is larger—water or land—and by how much?

Judy and Gregg are playing a game with fractions. They have to draw their own cards for each fraction. Whoever has the larger fraction wins both cards.

a) Draw the fraction card for each fraction below.

Judy gets the fraction $\frac{3}{4}$

Greg gets the fraction $\frac{5}{8}$

b) Explain who wins the round and how you know it.

A zookeeper made this line plot to show the ages of all the monkeys at a zoo.

Monkey Ages (in years)

a) What fraction of the monkeys at this zoo are eight years old?

b) What fraction of all the monkeys at this zoo are not 8 years old?

David has this set of different-sized wrenches.

He takes out a wrench with a size of $\frac{5}{8}$ inch and another wrench with a size of $\frac{7}{16}$ inch.

a) Which of these two wrench sizes is larger? Show your work or explain how you know.

David needs a different wrench with a size between $\frac{1}{4}$ inch and $\frac{3}{8}$ inch.

b) What size wrench could David use? Write your answer as a fraction. Show your work or explain how you know.

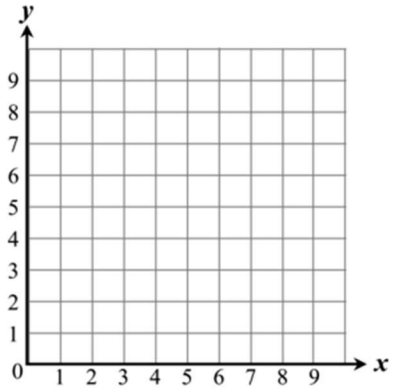
David will put away the wrenches with the sizes listed below.

$\frac{3}{8}$ inch, $\frac{7}{16}$ inch, $\frac{13}{32}$ inch

c) What is the order of these wrench sizes from least to greatest? Show your work or explain how you know.

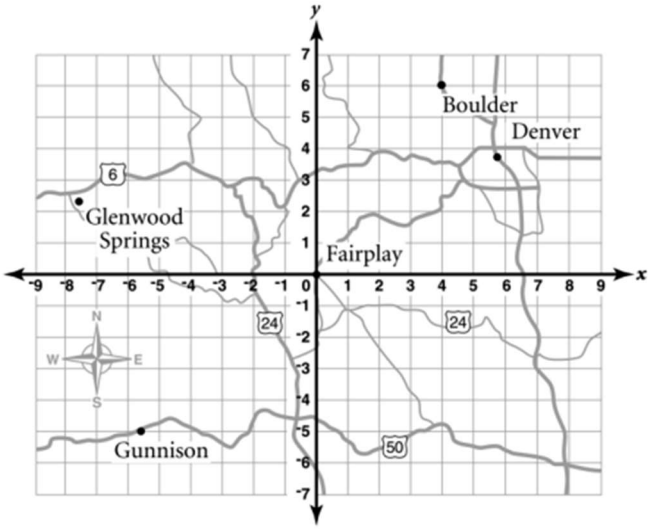
a) On the coordinate grid, plot the following points in order and connect each plotted point to the previous one in the order shown to form a figure.

1. Point $A(2, 5)$
2. Point $B(2, 9)$
3. Point $C(5, 7)$
4. Point $D(8, 9)$
5. Point $E(8, 5)$
6. Point $A(2, 5)$



b) What is the area, in square units, of the enclosed figure?

Study the map and grid below. The origin of the grid is located at Fairplay.



Two airplanes depart and both will fly a straight course.

Part A Airplane A departs from Glenwood Springs and flies over a place located on the map at coordinates $(1, 5)$ on the grid. Plot these coordinates and label them as Point R. Draw a straight line from Glenwood Springs through Point R to the edge of the map.

Part B A day later, Airplane B departs from Gunnison and flies over a place located on the map at coordinates $(-2, -2)$ on the grid. Plot these coordinates and label them as Point S. Draw a straight line from Gunnison through Point S to the edge of the map.

Part C On the lines below, write the coordinates of the point on the grid where your 2 straight lines intersect.

(_____, _____)

Plot four unique points on the coordinate grid that are each 5 units from the point $(1, 2)$. Each point must contain coordinates with integer values.