The mission of Hermon High School is to prepare students for personal success in college, career, and community.

Applied Topics in Algebra

Instructor(s):
Name: Shelley Cyr
Room number: 214
Email: shelley.cyr@schools.hermon.net

Course Description: This course is designed to improve basic math skills within the framework of guiding students to become knowledgeable consumers outside of the classroom environment. The course is intended to allow students to become comfortable describing the world quantitatively, using mathematical reasoning and traditional algebraic tools. Students will be taught to better understand data representations, calculate unit prices, apply discounts, work with measurements, apply geometry concepts, and apply trigonometry concepts in everyday situations.
This course does not satisfy Algebra II requirement for admission to a four year college/university.

2 Semesters/ 1 Credit

Graduation Standards:

HS.M.1A Applies properties of real numbers and quantitative reasoning.
HS.M.2.A Solves polynomial, rational, radical, and transcendental equations & systems of equations.

Unit 1	**Thinking Mathematically**
Summary	Thinking mathematically means thinking algebraically. This unit aims to introduce thinking mathematically as creative problem solving through reasoning, processes, and techniques. Topics include: Estimating and rounding, order of operations, evaluating powers, and then to apply problem solving strategies.
Performance Indicators Assessed in Unit	• (AR.A.1) Interpret the structure of expressions. • (AR.A.2) Write expressions in equivalent forms to reveal information and to solve problems. • (AR.A.8) Understand solving equations as a process of reasoning and explain the reasoning. • (AR.A.9) Solve equations and inequalities in one variable. • (QR.A.3) Reason quantitatively and use units to solve problems.

Understandings:	**Students will know…**	**Students will be able to…**
• How estimating can help to confirm if a solution is correct. • How proper, careful calculations will save mistakes	• How to solve order of operations expressions including exponents and radicals.	• Make sense of problems and persevere in solving them.

and money in the real world. ● How solving an equation is a process of reasoning.	● How to use operations with rational numbers. ● How to estimate and round. ● How to find tax, tip, and discount. ● How to write and solve percent change problems. ● How to use problem solving strategies to solve real world problems.	● Reason abstractly and quantitatively. ● Look for and express regularity in repeated reasoning. ● Attend to precision.
Unit 2	**Fractions, Decimals, and Percents.**	
Summary	Students will review computation with fractions, decimals, and percents. They will express rational values with equivalent representations. Students will learn to compute taxes, tips, percent increase, and percent decrease. They will then solve percent equations. The unit culminates with students producing pie charts which display data in percentage form.	
Performance Indicators Assessed in Unit	● QR.A.3 Reason quantitatively and use units to solve problems. ● QR.A.2 Use properties of rational and irrational numbers. ● AR.A.2 Write expressions in equivalent forms to reveal information and to solve problems. ● AR.A.8 Understand solving equations as a process of reasoning and explain the reasoning. ● AR.A.9 Solve equations and inequalities in one variable.	
Understandings:	**Students will know…**	**Students will be able to…**
● What a percent is and how it's used in the real-world. ● How solving an equation is a process of reasoning. ● How can you change between representations and still express the same quantity?	● Equivalent ways of writing percent, fraction and decimal representations. ● How percent change affects an overall total and how to represent that as an equation.	● Make sense of problems and persevere in solving them. ● Reason abstractly and quantitatively. ● Attend to precision.

	● How to calculate tax, tip and discounts. ● Write and solve percent equations.	

Unit 3	**Ratios and Proportions**
Summary	**Unit summary:** This unit furthers students' understanding of ratios. They'll learn to recognize and apply these numbers in familiar situations and to describe them both verbally and symbolically. By the time they complete the unit, they'll be able to define, write, simplify, and evaluate ratios, rates, and proportions.The unit assessment will be an application project.
Performance Indicators Assessed in Unit	HS.M.1.C Reason quantitatively and use units to solve problems. HS.M.1.H - Analyzes and uses proportional relationships HS.M.1.G - Understands ratio concepts and uses ratio reasoning to solve problems HS.M.2.H. Understand solving equations as a process of reasoning and explain the reasoning. (HSA.REI.A.1-2) HS.M.2.I Solve equations and inequalities in one variable. (HSA.REI.B.3-4)

Understandings:	**Students will know…**	**Students will be able to…**
● Students will understand the differences and similarities between rates, ratios and proportions and will be able to identify which one to apply in certain situations.	● A percentage is a proportion out of 100. ● A proportion is an equation in which two ratios are set equal to each other. ● A ratio is an ordered pair of numbers a and b, which is expressed in a/b form. ● Rates are comparisons of two quantities with different units.	● Solve problems involving ratios and proportions.. ● Use ratio and rate reasoning to solve real-world and mathematical problems ● Write and solve proportional equations. ● Compare rates. ● Apply understanding of ratios and proportions in culmination.

Unit 4	Units of Measure	
Summary	**Unit summary:** Students will apply knowledge of ratios and rates to compute unit pricing. They will learn how to use both US customary and metric systems of measurement. Students will convert from one unit to another and compute with measures.	
Performance Indicators Assessed in Unit	HS.M.1.B. Reason quantitatively and use units to solve problems. HS.M.1.E - Applies a process of mathematical reasoning to solve a problem. HS.M.1.G - Understands ratio concepts and uses ratio reasoning to solve problems. HS.M.2.B - Writes and solves equations and inequalities in one variable. HS.M.4.K - Solves problems involving measurement and estimation	
Understandings:	**Students will know…**	**Students will be able to…**
● How to change between units and still represent the same quantity. ● How to calculate and compare and compare unit pricing.	● How to compute unit prices. ● How to convert between different units of measure.	● Change units in dimensional analysis. ● Use unit pricing in decision making. ● Apply concepts of measurement and conversions to solve real-world problems.
Unit 5	**Geometry**	
Summary	**Unit summary:** Students will compute areas and perimeters of plane figures, will visualize 3-dimensional objects, and compute surface areas of 3D objects.	
Performance Indicators Assessed in Unit	HS.M.1.B. Reason quantitatively and use units to solve problems. HS.M.1.E - Applies a process of mathematical reasoning to solve a problem. HS.M.1.G - Understands ratio concepts and uses ratio reasoning to solve problems. HS.M.2.B - Writes and solves equations and inequalities in one variable. HS.M.4.K - Solves problems involving measurement and estimation	
Understandings:	**Students will know…**	**Students will be able to…**
● Students will develop 2-D and 3-D spatial understanding.	● The difference between 2D and 3D shapes concepts of area, perimeter, volume, surface area how to use formulas	● Calculate area and perimeter for plane shapes-rectangles, triangles, circles, parallelogram, trapezoid.

		• Apply formulas in geometric problem solving. • Calculate surface area and volume for 3-D shapes. • Apply area concepts to cost analysis in an application project.
Unit 6	**Trigonometry**	
Summary	**Unit summary:** Students will use pythagorean theorem, similarity, properties of right triangles, trigonometry to find missing measures of triangles. Students will practice application of concepts to real-world situations.	
Performance Indicators Assessed in Unit	HS.M.4.A - Knows geometry terms and definitions HS.M.4.C - Uses similarity of triangles in problem solving HS.M.4.E - Uses properties of triangles in problem solving, including trigonometry	
Understandings:	**Students will know…**	**Students will be able to…**
• Students will understand how right triangles apply to the physical world.	• Trig ratios and how they are related. • The pythagorean theorem and when it can be applied. • When to use right triangle trig vs law of sines/law of cosines • When to use trig, pythagorean theorem, and similar triangles	• apply the pythagorean theorem. • apply properties of similar triangles. • use trig ratios to find missing sides and angles. • apply trig ratios to find angles of elevation and depression. • apply law of sines/law of cosines to solve oblique triangles.
Unit 7	**Data Representations**	
Summary	**Unit summary:** An overview of how to interpret basic data sets and statistics. Investigation of various ways to collect, calculate, and display data. This unit will provide information that can help students recognize when statistical information is being manipulated and misinterpreted.	
Performance	HS.M.4.A - Knows geometry terms and definitions	

Indicators Assessed in Unit	HS.M.4.C - Uses similarity of triangles in problem solving HS.M.4.E - Uses properties of triangles in problem solving, including trigonometry

Understandings:	**Students will know…**	**Students will be able to…**
• When collecting data for use in statistics, what are the common errors and how can they be avoided? • How can collected data be evaluated and displayed to provide useful information?	• Sampling techniques • Frequency distributions • Histograms • Stem & Leaf displays • Misuses of statistics • Range • Mean, median, mode • Percentiles and quartiles • Standard deviation • Correlation • Regression	• Identify sampling techniques and common errors • Evaluate data displays • Calculate averages • Understand appropriate data displays from given information • Answer questions based on data displays.

Summative Assessments/Retake

- Summative assessments will count as 70% of the grade.
- Students have the opportunity to retake summative assessments.
- The student must submit a retake form to the teacher within five (5) school days of the date that the summative assessment score is reported to the student.
- The highest score a student can receive on a retake or late assessment is a 75.
- The score achieved on a retake will replace the current score (even if the score is lower).
- If a student is making up a test from an absence, that assessment will be graded up to 100.

Make-up Work

Upon their return to school from an absence, it is the student's responsibility to secure make-up work from their teacher. The due date of the missed work will be one additional class period for each day of absence from that class or at the discretion of the teacher.

Grading of Formative Assessments

- Formative assessments will count as 30% of the grade.
- Formative assessments may be scored on either a 0-100 scale or a 0-4 scale.
- The 0-4 scale will be represented in Power School as 4=100, 3=87, 2=77, and 1=67.
- The method of scoring of formative assessments will be determined by assignment.

Finals / Midterms

An end of course Final Exam will be conducted, making up 10% of the students overall grade.