Pre-Algebra

Course Summary

This course is meant for students ages 9 to 13 who have completed, at a minimum, the Common Core (or equivalent) curriculum for Grade 5.

Students will be learning problem solving techniques and common algorithms to work on the following topics:

- Properties of Arithmetic
- Exponents
- Number Theory
- Fractions
- Equations and Inequalities
- Decimals
- Ratios, Conversions and Rates
- Percents
- Square Roots
- Angles
- Perimeter and Area
- Right Triangles and Quadrilaterals
- Data and Statistics
- Counting
- Problem-Solving Strategies

Pre Requisites

Students registering for this course should be comfortable with the following Math Topics:

- Identifying numbers up to 1 billion
- Comfortable with arithmetic operations: addition, subtraction, multiplication, division
- Arithmetic with at least 4-digit numbers
- Fractions with up to 3-digit numbers
- Drawing and labeling a Cartesian plane

Students should also be willing and/or able to:

- Communicate in English either verbally or in writing
- Be respectful of other students in their classes
- Write down answers to any non-trivial problems

- Share their thoughts with the instructors to help them discover solutions to their problems
- Take constructive criticism when it comes to their learning habits

Course Materials (Required)

- All classes will be taught online, via **Zoom**. Your student will need a device with a microphone and camera.
- Homework will be assigned via The Art of Problem Solving: Prealgebra textbook. (https://artofproblemsolving.com/store)
- We use the ebook in class. You may choose the physical textbook or ebook; both versions are identical in content.

Students should also have access to:

- Ruler, Protractor, Compass (to make circles)
- Calculator (to check your work only)
- Paper, Pencils and Erasers
- Colored pencils or markers
- Reliable internet connection and digital device

Course Itinerary

Below is a list of the topics that will be covered in this class in order:

Week	Topic	Summary	Chapter	Homework (Do ALL the Exercises from the listed sections):
1	**Properties of Arithmetic**	Addition and Multiplication Negation and Subtraction	**Chapter 1**	1.2, 1.3, 1.4, 1.5
2		Reciprocals and Division,		1.6, 1.7
3		Summary and Challenge		1.8, Review, Challenge
4	**Exponents**	Squares and Higher	**Chapter 2**	2.1, 2.2 Alcumus checkpoint
5		Zero and Negative Review, Challenge		2.3, 2.4, Review, Challenge Alcumus checkpoint
6	**Number Theory**	Multiples and Divisibility	**Chapter 3**	3.1, 3.2
7		Primes and Factorization		3.3, 3.4

8		Least Common Multiple, Divisors		3.5, 3.6
9		Greatest Common Divisor Review, Challenge		3.7, Review, Challenge
10	**Fractions**	Introduction, Multiplication, Division	**Chapter 4**	4.1, 4.2, 4.3
11		Powers, Simplest Form		4.4, 4.5 Alcumus checkpoint
12		Comparing, Mixed Numbers		4.6,4.8
13		Adding and Subtracting Review, Challenge		4.7, Review, Challenge
14	THANKSGIVING WEEK	**FUN WEEK! - No homework**		None
15	**Equations and Inequalities**	Expressions, Linear Equations	**Chapter 5**	5.1, 5.2
16		Solving Expressions		5.3, 5.4
17		Inequalities Review, Challenge		5.5, 5.6, Review, Challenge
18	**Decimals**	Arithmetic, Rounding	**Chapter 6**	6.1, 6.2 Alcumus checkpoint
19		& Fractions, Repeating Review, Challenge		6.3, 6.4, Review, Challenge
20	**Ratios, Conversions and Rates**	Intro, Multi-way	**Chapter 7**	7.1, 7.2
21		Proportions, Conversions		7.3, 7.4
22		Speed & Other Rates Review, Challenge		7.5, 7.6, Review, Challenge
23	**Percents**	Intro, Word Problems	**Chapter 8**	8.1, 8.2 Alcumus checkpoint
24		Percent Increase & Decrease Review, Challenge		8.3, 8.4, Review, Challenge
25	Schools' "Ski Week"	REVIEW + COMPETITION FOCUS WEEK!		No homework

26	**Square Roots**	Intro, Rooting Non-Squares	**Chapter 9**	9.1, 9.2
27		Arithmetic with Roots Review, Challenge		9.3, 9.4, Review, Challenge
28	**Angles**	Measuring, Parallel Lines	**Chapter 10**	10.1, 10.2 Alcumus checkpoint
29		Polygons Review, Challenge		10.3, Review, Challenge
30	**Perimeter and Area**	Segments, Area	**Chapter 11**	11.1, 11.2
31		Circles Review, Challenge		11.3, 11.4, Review, Challenge
32	**Geometry**	Pythagorus, Triangles	**Chapter 12**	12.1,12.2 Alcumus checkpoint
33		Quadrilaterals Review, Challenge		12.3, 12.4, Review, Challenge
34	**Data and Statistics**	Basic Statistics and its Limits	**Chapter 13**	13.1, 13.2
35		Visualizing Data Review, Challenge		13.3, 13.4, Review, Challenge
36	**Counting**	Addition, Multiplication Principles	**Chapter 14**	14.1, 14.2 Alcumus checkpoint
37		Counting Pairs, Probability Review, Challenge		14.4, 14.5, Review, Challenge
38	**Problem Solving**	Patterns and Lists	**Chapter 15**	15.1, 15.2
39		Pictures and Working Backwards		15.3, 15.4, Review, Challenge
	Course Review	Alcumus!	**All**	No Homework!