

Essential Skills for Pre-Algebra (7th Grade)

Unit 1:

- In this unit, the students will learn: numbers in everyday use, positive and negative numbers, rational numbers and their uses, powers of ten and other numbers, more powers of ten, order of operations, other grouping symbols, scientific notation, and plotting points on coordinate graphs.

Unit 2:

- In this unit, the students will learn: to describe patterns with variables, translating words into algebraic expressions, expressions and formulas, the pythagorean theorem, formulas in spreadsheets, open sentences and graphing inequalities.

Unit 3:

- In this unit, the students will learn: decimals for numbers between integers, equal fractions, adding and subtracting fractions, estimating by rounding, fraction-decimal equivalence, fractions, decimals, and percents, using percents, square roots and probability.

Unit 4:

- In this unit, the students will learn: three little words: always, sometimes, never, properties of numbers, if-then statements, union and intersection of sets, the basic figures of geometry, unions and basic geometric shapes, what makes a good definition, classifying shapes and classifying numbers.

Unit 5:

- In this unit, the students will learn: models for addition, rules for adding positive and negative numbers, models for subtraction, connecting addition and subtraction, solving $x + a = b$, solving $x + a < b$, understanding $x + y = k$, adding and probabilities, i introduction to constructions and the triangle inequality.

Unit 6:

- In this unit, the students will learn: translations, reflections and reflection symmetry, rotations and rotation symmetry, tessellations, angles and lines, angles and parallel lines, properties of parallelograms, the triangle-sum property and calculating the distance between points.

Unit 7:

- In this unit, the students will learn: the area model for multiplication, multiplication of fractions, the distributive property, the area of a triangle, the area of a trapezoid, circle, and the size-change model for multiplication.

Unit 8:

- In this unit, the students will learn: the multiplication as shortcut addition, the rate-factor model for multiplication, multiplication with negative numbers, multiplying probabilities, combining percents, solving $ax=b$, graphing $y=ax+b$, solving $ax+b=c$, and solving $ax+b<c$.

Unit 9:

- In this unit, the students will learn: integer division, the rate model for division, division of fractions, division with negative numbers, division in equations and inequalities, the ratio-comparison model for division, proportions, proportional thinking, and proportions in similar figures.

Unit 10:

- In this unit, the students will learn: finding solutions using graphs, solving $ax+b=cx+d$, graphing $y<ax+b$, solving $ax+b<cx+d$, linear combinations, graphing $Ax+By=C$ and $Ax+By<C$, time-distance graphs, and graphs of formulas.

Unit 11:

- In this unit, the students will learn: lines and planes in space, depicting 3-dimensional figures on a plane, 2-dimensional nets for 3-dimensional shapes, 2-dimensional views of 3-dimensional figures, the surface area and volume of a box, surface areas of prisms and cylinders, volumes of prisms and cylinders, spheres, how changing dimensions affects area, and how changing dimensions affects volume.

Unit 12:

- In this unit, the students will learn: representing categorical data, histograms and stem-and-leaf plots, properties of the mean, deviations from the mean, medians and box plots, describing tolerance, and time series.