Middle School Learning Targets

7th Grade Pre-Algebra Learning Targets

1. Add, subtract, factor and expand expressions (numerical and variable)

a) I can add, subtract, multiply, and divide integers.

b) I can apply order of operations.

c) I can apply distributive property, commutative property, associative property, and the identity property.

d) I can simplify variable expressions (also involving distributive property).

e) I can use distributive property and combine like terms to calculate area of rectangles and triangles with variable expressions.

2. Solve multi-step linear equations and inequalities in one variable to solve problems (Construct inequalities on a number line.)

a) I can solve linear equations/inequalities in one variable with one solution.

b) I can solve linear equations in one variable with infinitely many solutions.

c) I can solve linear equations in one variable with no solution.

d) I can solve linear equations/inequalities with rational number coefficients.

e) I can solve linear equations/inequalities that require expanding expressions using the distributive property.

f) I can solve linear equations/inequalities whose solutions require collecting like terms.

g) I can solve linear equations/inequalities with variables on both sides.

h) I can use equations/inequalities to solve word problems.

i) I can graph solutions of inequalities on a number line.

3. Perform operations on rational numbers with variable expressions

a) I can find Greatest Common Factor (GCF) of monomials.

b) I can find Least Common Multiple (LCM) of monomials.

c) I can find the prime factorization of numbers and variable expressions.

d) I can estimate and use mental math.

4. Understand properties of positive and negative exponents including scientific notation

a) I can use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities.

b) I can use scientific notation to compare and order different quantities.

c) I can perform multiplication with numbers expressed in scientific notation.

5. Simplify ratios and calculate rates and unit rate.

a) I can compute unit rates associated with ratios of fractions, including ratios of lengths, areas, and other quantities measured in like or different units.

b) I can set up proportions or conversions to compute unit rates measured in different units.

c) I can identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.

d) I can identify similar and congruent figures and find unknown side lengths of similar figures.

e) I can find the ratio of corresponding side lengths of similar figures.

f) I can find measures of angles or sides of congruent figures.

6. Write and solve proportions (including scale drawings)

a) I can represent proportional relationships by equations.

b) I can solve problems involving scale drawings of geometric figures.

c) I can set up proportions to calculate lengths and areas from scale drawings.

d) I can reproduce scale drawing on a different scale (example – comic strip).

7. I can apply understandings of operations of fractions and decimals

a) I can convert from fractions to decimals to percent and vice-versa.

b) I can add, subtract, multiply and divide fractions.

c) I can determine whether rational numbers terminate or repeat.

d) I can determine whether a number is rational or irrational.

e) I can solve real world problems involving operations with fractions and decimals.

8. Solve percent problems including simple interest with account balance, mark ups, discounts, sales tax and tips, and percent of change.

a) I can solve simple interest problems.

b) I can solve mark up and mark down problems.

c) I can solve gratuities, commission, and fee problems.

d) I can solve percent increase and decrease problems.

e) I can solve tax problems.

9. Write and graph linear equations in two variables including using slope and y-intercept

a) I can graph proportional relationships, interpreting the unit rate as the slope of the graph.

b) I can decide whether two quantities are in a proportional relationship by testing for equivalent rations in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.
(Example (6, 30) means – working 6 hours would earn $30 in this situation)

c) I can derive the equation $y = mx$ for a line through the origin.

d) I can derive the equation y=mx + b for a line intercepting the vertical axis at b.

10. Solve real world and mathematical problems involving area, surface area, and volume of two-and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, cylinders, spheres and right prisms

a) I can describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.

b) I can name three-dimensional figures and distinguish the properties between them.

c) I can name and define characteristics of two-dimensional shapes.

d) I can determine the 2D shape created when a 3D shape is sliced.

e) I can use the formulas for area and circumference of a circle to solve problems.

f) I can calculate area and circumference of a circle.

g) I can use area and circumference to solve problems.

h) I can understand how circumference and area relate to each other.

i) I can define area, volume, and surface area of 2D and 3D objects.

j) I can calculate area, volume, and surface area of 2D and 3D objects (surface area of prisms, pyramids and cylinders; volume of prisms, pyramids, cones, spheres and cylinders).

k) I can solve real world problems involving 2D and 3D objects.

11. Solve real-world problems involving angle measure

a) I can use informal arguments to establish facts about the sum of the interior angles of a triangle.

b) I can write and solve simple equations for an unknown side in a triangle using perimeter.

c) I can use facts about supplementary, complementary, vertical, and adjacent angles in a multistep problem to write and solve simple equations for an unknown angle in a figure.

d) I can define supplementary, complementary, vertical and adjacent angles.

e) I can write and solve simple equations for an unknown angle in a figure (example: x and 3x are two complementary angles so find x, OR 3x and 5x+2 are vertical angles so find x).

f) I can identify special angle pairs and angles created when a transversal intersects two other lines.

g) I can use informal arguments to establish facts about the angles created when parallel lines are cut by a transversal (corresponding angles, alternate interior angles, alternate exterior angles, and vertical angles).

h) I can calculate measures of interior and exterior angles of polygons.

12. Describe the effect of translations, rotations, reflections, and dilations on two-dimensional figures

a) I can understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations.

b) I can describe a sequence that exhibits the similarity between two similar two-dimensional figures.

13. I can solve problems using Pythagorean theorem, distance, midpoint and slope formulas

a) I can explain a proof of the Pythagorean Theorem and its converse.

b) I can apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.

c) I can plug in coordinate points into the midpoint formula to determine the midpoint of those two points.

d) I can apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

14. Use random sampling to draw inferences about a population

a) I can understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population.

b) I can understand that random sampling tends to produce representative samples and support valid inferences.

c) I can use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples of the same size to gauge the variation in estimates or predictions. (Example – 5% of all tires produced are defective. How many defective tires would there be if 20,000 were produced?)

15. Calculate theoretical and experimental probability and create area models, tree diagrams and charts

a) I can understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around ½ indicates and event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.

b) I can identify independent and dependent events.

c) I can create a tree diagram and apply the multiplication principal to determine the number of possible outcomes of an event.

d) I can calculate odds in favor and odds against.

e) I can analyze and display data using plots, tables and graphs.

f) I can construct and analyze a single and double box and whisker plot.

g) I can construct and analyze a frequency table and histogram.

h) I can construct and analyze a stem and leaf plot.