

# 8<sup>TH</sup> GRADE MATHEMATICS CHECKLIST

## Goals 6 – 10

### Illinois Learning Standards A-D

### Assessment Frameworks

### Calculators Allowed on ISAT

ISAT test questions are derived from this checklist. Use as a curriculum guide.

#### REPRESENTATIONS AND ORDERING

- \_\_\_\_\_ Read, write, and recognize equivalent representations of integer powers of 10.
- \_\_\_\_\_ Read, write, recognize, model, and interpret integers, including translating numerical expressions.
- \_\_\_\_\_ Recognize, translate between, and apply multiple representations of rational numbers (decimals, fractions, mixed numbers, percents, and roots).
- \_\_\_\_\_ Use scientific notation to represent numbers and solve problems.
- \_\_\_\_\_ Represent repeated factors using exponents.
- \_\_\_\_\_ Order and compare rational numbers.
- \_\_\_\_\_ Identify and locate rational and irrational numbers (e.g.,  $\pi$ ,  $\sqrt{2}$ ,  $\sqrt{5}$ ) on a number line.
- \_\_\_\_\_ Solve problems involving descriptions of numbers, including characteristics and relationships (e.g., exponents, roots, prime/composite, prime factorization, greatest common factor, least common multiple).

#### COMPUTATION, OPERATIONS, ESTIMATION, AND PROPERTIES

- \_\_\_\_\_ Solve problems and number sentences involving addition, subtraction, multiplication, and division using rational numbers, exponents, and roots.
- \_\_\_\_\_ Identify and apply order of operations to simplify numeric expressions involving integers (including exponents and roots), fractions, and decimals.
- \_\_\_\_\_ Identify and apply the following properties of operations with rational numbers:
  - \_\_\_\_\_ The commutative and associative properties for addition and multiplication;
  - \_\_\_\_\_ The distributive property;
  - \_\_\_\_\_ The additive and multiplicative identity properties;
  - \_\_\_\_\_ The additive and multiplicative inverse properties; and
  - \_\_\_\_\_ The multiplicative property of zero.

\_\_\_\_\_ Describe the effect of multiplying and dividing by numbers, including the effect of multiplying or dividing a rational number by:

\_\_\_\_\_ A number less than zero;

\_\_\_\_\_ A zero;

\_\_\_\_\_ A number between zero and one; and

\_\_\_\_\_ A number greater than one.

\_\_\_\_\_ Select, use, and justify appropriate operations, methods, and tools to compute or estimate with rational numbers. Verify solutions and determine the reasonableness of results.

\_\_\_\_\_ Estimate the square or cube root of a number less than 1,000 between two whole numbers (e.g.,  $\sqrt[3]{200}$  is between 5 and 6).

---

### **RATIOS, PROPORTIONS AND PERCENTS**

---

\_\_\_\_\_ Use ratios to describe problem situations.

\_\_\_\_\_ Use ratios to describe problem situations.

\_\_\_\_\_ Read, write, recognize, model, and interpret percents, including those less than 1% and greater than 100%.

\_\_\_\_\_ Solve number sentences and problems involving fractions, decimals, and percents (e.g., percent increase and decrease, interest rates, tax, discounts, tips).

---

### **UNITS, TOOLS, ESTIMATION, AND APPLICATIONS**

---

\_\_\_\_\_ Select and use appropriate standard units and tools to solve measurement problems, including measurements of polygons and circles.

\_\_\_\_\_ Solve problems involving perimeter/circumference and area of polygons, circles, and composite figures using diagrams, models, and grids or by measuring or using given formulas (may include sketching a figure from its description).

\_\_\_\_\_ Compare and estimate length (including perimeter/circumference), area, volume, weight/mass, and angles ( $0^\circ$  to  $360^\circ$ ) using referents.

\_\_\_\_\_ Solve problems involving the volume or surface area of a right rectangular prism, right circular cylinder, or composite shape using an appropriate formula or strategy.

\_\_\_\_\_ Solve problems involving unit conversions within the same measurement system for length, weight/mass, capacity, square units, and measures expressed as rates (e.g., converting feet/second to yards/minute).

\_\_\_\_\_ Solve problems involving scale drawings, maps, and indirect measurement (e.g., determining the height of a building by comparing its known shadow length to the known height and shadow length of another object).

### **REPRESENTATIONS, PATTERNS, AND EXPRESSIONS**

\_\_\_\_\_ Analyze, extend, and create sequences or linear functions, and determine algebraic expressions to describe the  $n^{\text{th}}$  term of a sequence.

\_\_\_\_\_ Write an expression using variables to represent unknown quantities.

\_\_\_\_\_ Simplify algebraic expressions.

\_\_\_\_\_ Recognize and generate equivalent forms of algebraic expressions.

\_\_\_\_\_ Evaluate or simplify algebraic expressions with one or more rational variable values (e.g.,  $3a^2 - b$  for  $a = 3$  and  $b = 7$ ).

### **CONNECTIONS USING TABLES, GRAPHS AND SYMBOLS**

\_\_\_\_\_ Recognize, describe, and extend patterns using rate of change.

\_\_\_\_\_ Represent linear equations and quantitative relationships on a rectangular coordinate system, and interpret the meaning of a specific part of a graph.

\_\_\_\_\_ Translate between different representations (table, written, graphical, or pictorial) of whole number relationships and linear expressions.

\_\_\_\_\_ Interpret the meaning of slope and intercepts in linear situations.

\_\_\_\_\_ Identify, graph, and interpret up to two inequalities with a single variable (including the intersection or union of these inequalities) on a number line.

### **WRITING, INTERPRETING, AND SOLVING EQUATIONS**

\_\_\_\_\_ Represent and analyze problems with linear equations and inequalities.

\_\_\_\_\_ Solve linear equations and inequalities in one variable over the rational numbers (e.g.,  $5x+7=-13$ ,  $4x-3=-7x+8$ ,  $-2x+3>-5$ ).

\_\_\_\_\_ Solve word problems involving unknown quantities.

### **PROPERTIES OF SINGLE FIGURES AND COORDINATE GEOMETRY**

\_\_\_\_\_ Solve problems involving two- and three-dimensional shapes.

- \_\_\_\_\_ Solve problems that require knowledge of triangle and quadrilateral properties (e.g., triangle inequality).
- \_\_\_\_\_ Find the length of any side of a right triangle using the Pythagorean theorem (whole number solutions).
- \_\_\_\_\_ Identify, describe, and determine the radius, diameter, and circumference of a circle and their relationship to each other and to  $\pi$ .
- \_\_\_\_\_ Graph points, and identify coordinates of points on the Cartesian coordinate plane (all four quadrants).
- \_\_\_\_\_ Represent and identify geometric figures using coordinate geometry, including those resulting from transformations.
- \_\_\_\_\_ Analyze the results of a combination of transformations, and determine a different transformation that could produce the same result.
- \_\_\_\_\_ Identify or analyze relationships of angles formed by intersecting lines (including parallel lines cut by a transversal) and angles formed by radii of a circle.
- \_\_\_\_\_ Solve problems involving vertical, complementary, and supplementary angles.

---

### **RELATIONSHIPS BETWEEN AND AMONG MULTIPLE FIGURES**

---

- \_\_\_\_\_ Identify front, side, and top views of a three-dimensional solid built with cubes.
- \_\_\_\_\_ Solve problems involving congruent and similar figures.
- \_\_\_\_\_ Relate absolute value to distance on the number line.

---

### **RELATIONSHIPS BETWEEN AND AMONG MULTIPLE FIGURES**

---

- \_\_\_\_\_ Identify front, side, and top views of a three-dimensional solid built with cubes.
- \_\_\_\_\_ Solve problems involving congruent and similar figures.
- \_\_\_\_\_ Relate absolute value to distance on the number line.

---

### **DATA ANALYSIS AND STATISTICS**

---

- \_\_\_\_\_ Read, interpret (including possible misleading characteristics), and make predictions from data represented in a bar graph, line (dot) plot, Venn diagram (with two or three circles), chart/table, line graph, scatterplot, circle graph, stem-and-leaf plot, or histogram.
- \_\_\_\_\_ Compare and contrast the effectiveness of different representations of the same data.

- \_\_\_\_\_ Create a bar graph, chart/table, line graph, or circle graph and solve a problem using the data in the graph for a given set of data.
- \_\_\_\_\_ Identify or draw a reasonable approximation of the line of best fit from a set of data or a scatter plot, and use the line to make predictions.
- \_\_\_\_\_ Analyze and apply measures of central tendency (mode, range, median, and mean) in problem-solving situations.

---

**PROBABILITY**

---

- \_\_\_\_\_ Solve problems involving the probability of an event composed of repeated trials, compound events (including independent events), or future events with or without replacement.
- \_\_\_\_\_ Represent all possible outcomes (sample space) for simple or compound events (e.g., tables, grids, tree diagrams).
- \_\_\_\_\_ Solve simple problems involving the number of ways objects can be arranged (permutations and combinations).