National Mathematics Bee

2026-27 Regional Tournament Study Guide

Math Bee | 4th Grade & Under • 5th-6th Grades • 7th-8th Grades

This guide covers the skills you need to do well at the 2026-27 Regional Math Bee. It is not a list of the questions you will hear. It is a map of what you should be able to do quickly and accurately. Start with the section on how the Bee works, then turn to your division. Each division section lists skills by topic, and practice problems for every division follow.

Each division builds on the one before it. A 7th-8th grade player should be comfortable with every skill in the 4th Grade & Under and 5th-6th sections, since easier questions appear at every level.

How the Math Bee Works

Every round mixes three kinds of questions:

Question type	What to expect
Computation Basic	A direct problem, such as "What is 20 percent of 350?" The moderator reads it **twice**, and you have **30 seconds** to answer.
Computation Pyramidal	A word problem that walks you through the method step by step, then asks for the final answer with "For the point, ..." It is also read **twice**, with **30 seconds** to answer. The setup tells you how to solve it, so follow along as it is read.
Non-Computation	A paragraph about a math idea, a mathematician, a tool, or a real-world use of math. The clues start hard and get easier. Buzz as soon as you know the answer.

Giving Your Answer

- **Simplest fractional form.** When a question asks for it, reduce the fraction all the way: say "three-fourths," not "six-eighths." A decimal will not count when a fraction is asked for.
- **Decimal form.** When a question asks for a decimal, give one (for example, "33.2").
- **Negative numbers.** Say "negative" clearly. "Twelve" is wrong when the answer is "negative twelve."
- **Pi.** If the question gives measurements "times pi," you can leave pi in your answer (for example, "36 pi").
- **Coordinates.** Give both numbers in order, x first: "(3, negative 2)."
- **Answer what was asked.** If the question asks for "x plus y," "the total," or "the original price," make sure your final number is that quantity.

4th Grade & Under

Number Sense & Arithmetic

- Add and subtract numbers up to four digits, including regrouping (borrowing and carrying).
- Multiply a 2-digit number by a 2-digit number and a 3-digit number by a 1-digit number.
- Divide, including problems with remainders. In word problems, decide whether to round up (for example, how many buses are needed).
- Know place value through the millions, and round to the nearest ten or hundred.
- Know even and odd numbers, and find the largest or smallest number with a given number of digits.
- Understand squares and cubes as repeated multiplication (4 cubed = 4 × 4 × 4).
- Find factors and multiples, recognize prime numbers, and count how many factors a number has.
- Spot number patterns: counting by a fixed amount, square numbers, and triangular numbers (1, 3, 6, 10, ...).

Fractions & Decimals

- Add and subtract fractions with the same or different denominators, and simplify the result.
- Add and subtract decimals, especially with money.

Geometry & Measurement

- Find the perimeter and area of rectangles and squares.
- Find the perimeter of triangles and regular polygons (all sides equal).
- Find the area of a triangle (half of base times height).
- Find a missing side when you know the area or perimeter.
- Name polygons by their number of sides (triangle through octagon) and know their basic properties.
- Know that a right angle measures 90 degrees, and add or subtract angle measures.

Data, Probability & Counting

- Find the mode, median, and range of a short list of numbers.
- Write a simple probability as a fraction (rolling a die, drawing a marble, spinning a spinner).
- Count choices by multiplying (5 shirts and 3 hats make 15 outfits) and count the ways to put a few items in order.

Early Algebra

- Solve one-step equations and simple two-step equations (2w + 1 = 35).
- Find the value of an expression when you are told what the letter equals.
- Work with ratios ("3 blue for every 4 red") and simple proportions ("1 in every 12").

Word Problems & Applied Math

- Convert customary units: gallons, quarts, pints, and cups; feet and inches; hours and minutes.
- Find start times, end times, and elapsed time on a clock.
- Work with dollars and cents, including making change.
- Use rates such as "per hour" or "per minute" to find a total.

5th-6th Grades

Know everything in the 4th Grade & Under section, plus the following.

Number Sense & Arithmetic

- Evaluate powers (2 to the 10th, 6 cubed) and follow the order of operations through a chain of steps.
- Add, subtract, multiply, and divide negative numbers.
- Find prime factorizations, greatest common factors, and least common multiples.
- Recognize perfect squares, and find the sum of the first several odd or even numbers.

Fractions, Decimals & Percents

- Multiply and divide fractions and mixed numbers.
- Multiply and divide decimals.
- Find a percent of a number, and find what percent one number is of another.
- Solve discount problems, including working backward to the original price.
- Find percent increase and percent decrease.

Geometry & Measurement

- Find the area of parallelograms, triangles, and trapezoids, and find a missing base or height.
- Use pi with circles: circumference (2 × pi × r) and area (pi × r squared), and work backward to the radius.
- Find the surface area and volume of cubes and rectangular prisms.
- Know that a triangle's angles add to 180 degrees and a quadrilateral's add to 360 degrees.
- Use complementary (90°), supplementary (180°), and vertical angles, and the equal angles of an isosceles triangle.
- Understand scale: if every side of a shape is multiplied by a number, so is the perimeter.
- Find the distance from the origin to a point on the coordinate plane.

Statistics & Probability

- Find the mean, and find a missing value when the mean is known.
- Use the range, median, and mode.
- Find the probability that an event does not happen (1 minus the probability that it does).
- Find the probability of one event or another when they cannot happen together (add them).

Algebra

- Solve one- and two-step equations, including ones with the variable on both sides (2x + 71 = 133 + x).
- Solve simple inequalities and find the largest or smallest value that works.
- Evaluate expressions with more than one variable or with negative values.
- Use linear models: a starting amount plus a rate times time (elevation, temperature, savings).

Word Problems & Applied Math

- Use distance = rate × time to find any one of the three.
- Solve ratio problems, including chains of ratios.
- Calculate pay with regular and overtime hours, and costs with dollars and cents.

7th-8th Grades

Know everything in the 4th Grade & Under and 5th-6th sections, plus the following.

Exponents & Roots

- Use the laws of exponents: when you multiply powers of the same base, add the exponents; when you divide, subtract them.
- Know powers of 2 through at least 2 to the 10th, and use them in real-world problems such as computer memory.
- Find square roots of perfect squares up to at least 30 squared.

Algebra & Functions

- Solve multi-step equations, and remember to flip an inequality when you multiply or divide by a negative number.
- Solve a system of two linear equations, or combine the equations to find a quantity like "x plus y" directly.
- Use function notation: if $f(x) = 6x - 7$, find $f(-20)$.
- Solve equations with a squared expression, such as $(c + 2)^2 = 64$, and choose the solution the question asks for.
- Chain substitutions (if $x = 2y$ and $y = 5z$, then $x = 10z$) and distribute to find a coefficient.
- Find terms of arithmetic sequences, including ones that count down.

Lines & the Coordinate Plane

- Find the slope between two points, and know that perpendicular lines have negative reciprocal slopes.
- Use slope-intercept form ($y = mx + b$) and find x- and y-intercepts.
- Find where two lines intersect.
- Translate points (slide them left, right, up, or down).
- Find the distance between two points using the Pythagorean theorem.

Geometry

- Use the Pythagorean theorem, and know the common triples: 3-4-5, 5-12-13, 8-15-17, 7-24-25, and 9-40-41 (plus their multiples).
- Move between a circle's radius, diameter, circumference, and area.
- Find the volume of cylinders, cones, and spheres, and work backward to a missing height.
- Find the surface area of rectangular prisms.
- Know that multiplying a length by k multiplies the area by k squared.
- Know the angle relationships for intersecting lines, triangles, and quadrilaterals, and what makes two triangles congruent.

Right-Triangle Trigonometry

- Use SOHCAHTOA: sine = opposite ÷ hypotenuse, cosine = adjacent ÷ hypotenuse, tangent = opposite ÷ adjacent.
- Use one trig ratio and a Pythagorean triple to find another (if sine is 7/25, cosine is 24/25).

Statistics & Probability

- Find the probability of independent events happening together (multiply), and of picks made without replacement, where the second pick depends on the first.
- Use complements and "or" probabilities, and count outcomes.

Word Problems & Applied Math

- Find simple interest (principal × rate × time), and solve percent change and discount problems.
- Use linear cost models (a fixed fee plus a cost per use) to find a total or a maximum number of uses.

Practice Problems

These problems are written in the style of the Bee. Have someone read each one aloud twice, then give yourself 30 seconds. Try the problems for your own division and the ones below it.

4th Grade & Under

1. **Computation Basic:** What is 406 minus 238?
2. **Computation Basic:** In simplest fractional form, what is one-sixth plus one-third?
3. **Computation Basic:** A bag has 4 green marbles and 6 yellow marbles. In simplest fractional form, what is the probability of picking a green marble?
4. **Computation Basic:** What is the perimeter of a regular hexagon with sides that are 9 units long?
5. **Computation Pyramidal:** You want to know how many quarts are in 7 gallons. You know there are 4 quarts in each gallon, so you multiply 7 by 4. For the point, how many quarts are in 7 gallons?

Answers: (1) 168 (2) 1/2 (3) 2/5 (4) 54 units (5) 28 quarts

5th-6th Grades

1. **Computation Basic:** What is 3 to the fourth power?
2. **Computation Basic:** What is 15 percent of 240?
3. **Computation Basic:** Solve for "x": 4 times "x" plus 9 equals 2 times "x" plus 25.
4. **Computation Basic:** What is the area of a trapezoid with bases of 6 and 10 units and a height of 5 units?
5. **Computation Pyramidal:** A jacket costs 45 dollars after a 25 percent discount, and you want to find its original price. You let "p" be the original price. Since you paid 75 percent of the original price, 0.75 times "p" equals 45. For the point, what was the original price?

Answers: (1) 81 (2) 36 (3) 8 (4) 40 square units (5) 60 dollars

7th-8th Grades

1. **Computation Basic:** In simplest form, what is the slope of the line through the points (2, 3) and (6, 11)?
2. **Computation Basic:** What is the length of the hypotenuse of a right triangle with legs of 20 and 21 units?
3. **Computation Basic:** If "x" plus "y" equals 10 and "x" minus "y" equals 4, what is "x" times "y"?
4. **Computation Basic:** A box has 4 red pens and 6 blue pens. You pick two pens without replacement. In simplest fractional form, what is the probability that both are red?
5. **Computation Pyramidal:** You want the volume of a cylinder with a radius of 4 units and a height of 9 units. You recall that volume equals pi times the radius squared times the height, so you multiply 16 pi by 9. For the point, what is the volume of the cylinder?

Answers: (1) 2 (2) 29 units (3) 21 (4) 2/15 (5) 144 pi cubic units

Non-Computation Topics (All Divisions)

Non-Computation questions test what you know about math, not how fast you can calculate. The topics below are good places to start reading. Learn the key facts about each: who, when, what it is used for, and any famous symbols or examples. Older divisions should expect more vocabulary from algebra, geometry, and trigonometry.

Topic area	Start with
Mathematicians	Pythagoras, Euclid, Archimedes, Hypatia, al-Khwarizmi, Fibonacci, Isaac Newton, Carl Friedrich Gauss, Ada Lovelace
Numbers & number systems	Zero, negative numbers, prime numbers, pi, Roman numerals, the Babylonian base-60 system, Egyptian fractions
Operations	Addition, subtraction, multiplication, division, remainders and modular ("clock") arithmetic
Shapes	Triangles, squares, pentagons, trapezoids, circles and the unit circle, spheres, polyhedra such as the dodecahedron
Geometry ideas	Right angles, vertical and supplementary angles, radians, congruence, the Pythagorean theorem, the distance formula
Algebra ideas (5th-8th)	Linear equations, roots or zeros of a function, absolute value, inequalities
Trigonometry (7th-8th)	Sine, cosine, tangent, and how they relate to the Pythagorean theorem
Probability & statistics	Probability, the empty set, the mean and its symbol mu, the Law of Large Numbers, coin-toss experiments
Math tools	The abacus, the slide rule, calculators, rulers and protractors
Math in the real world	Maps and cartography, the census, lotteries, taxes, time zones and UTC, money and interest

Quick Reference: Formulas

Formula	How to use it	Divisions
Rectangle	Area = length × width; Perimeter = 2 × (length + width)	All
Triangle	Area = ½ × base × height; angles add to 180°	All (angle sum 5th-8th)
Regular polygon	Perimeter = number of sides × side length	All
Parallelogram / Trapezoid	Area = base × height / Area = ½ × ($base_1$ + $base_2$) × height	5th-8th
Circle	Circumference = $2\pi r$; Area = πr^2	5th-8th
Rectangular prism / Cube	Volume = l × w × h; Cube surface area = $6s^2$	5th-8th
Mean	Sum of the values ÷ number of values	5th-8th
Percent change	(change ÷ original) × 100	5th-8th
Probability	favorable outcomes ÷ total outcomes; P(not A) = 1 − P(A)	All (complements 5th-8th)
Pythagorean theorem	$a^2 + b^2 = c^2$	7th-8th
Slope	$(y_2 - y_1) \div (x_2 - x_1)$	7th-8th
Cylinder / Cone / Sphere	$V = \pi r^2 h$ / $V = \frac{1}{3}\pi r^2 h$ / $V = 4/3\ \pi r^3$	7th-8th
Simple interest	I = principal × rate × time	7th-8th

Good luck!

The best preparation is steady practice: a little mental math every day, regular timed sets read aloud, and curiosity about where math comes from. We look forward to seeing you at the Regional Math Bee.