y = mx + b

x^2 + 5x + 6 = 0

OKLAHOMA

sqrt(x)

OSTP

7th GRADE MATH



MADE RIDICULOUSLY SIMPLE

A Comprehensive 7th Grade Math Study Guide to Acing the OSTP Test

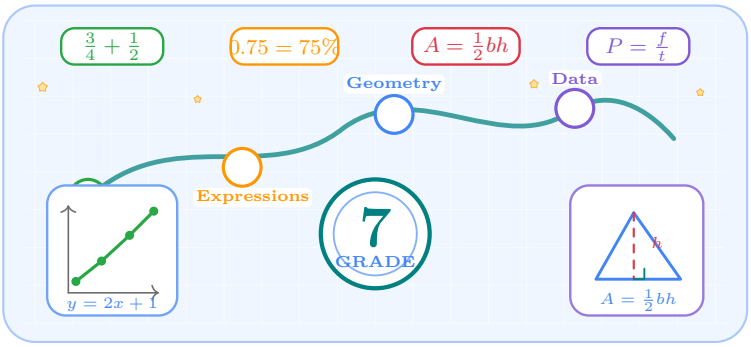
- COVERS ALL 7TH GRADE MATH STANDARDS
- EASY-TO-UNDERSTAND LESSONS & EXAMPLES
- PRACTICE QUESTIONS WITH DETAILED EXPLANATIONS
- TEST-TAKING STRATEGIES & TIPS
- BUILD CONFIDENCE. IMPROVE SCORES. SUCCEED!

LEARN SMART. PRACTICE MORE. ACE THE OSTP!

Oklahoma OSTP

7th Grade Math Made Ridiculously Simple

A Comprehensive 7th Grade Math Study Guide to Acing the OSTP Test



Reza Nazari

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7.A.2 Identify and justify proportional relationships using mathematical models and situations; solve problems involving proportional relationships and interpret results in the original context

7.A.2.1 Represent proportional relationships with tables, verbal descriptions, symbols, and graphs; translate from one representation to another. Determine and compare the unit rate (constant of proportionality, slope, or rate of change) given any of these representations

7.A.2.2 Solve multi-step problems with proportional relationships (e.g., distance-time, percent increase or decrease, discounts, tips, unit pricing, mixtures and concentrations, similar figures, other mathematical situations)

7.A.2.3 Use proportional reasoning to solve problems involving ratios

7.A.2.4 Use proportional reasoning to assess the reasonableness of solutions

7.A.3 Represent mathematical situations using equations and inequalities involving variables and rational numbers

7.A.3.1 Write and solve problems leading to linear equations with one variable in the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are rational numbers

7.A.3.2 Represent, write, solve, and graph problems leading to linear inequalities with one variable in the form $x + p > q$ and $x + p < q$, where p and q are nonnegative rational numbers

7.A.4 Use order of operations and properties of operations to generate and evaluate equivalent numerical and algebraic expressions

7.A.4.1 Use properties of operations (associative, commutative, and distributive) to generate equivalent numerical and algebraic expressions containing rational numbers, grouping symbols and whole number exponents

7.A.4.2 Evaluate numerical expressions using calculators and other technologies and justify solutions using order of operations and grouping symbols

7.D | Oklahoma

Grade 7 expectations grouped under 7.D.

7.D.1 Interpret and analyze data, creating the most appropriate display, using a variety of tools

7.D.1.1	Design simple experiments, collect data, and calculate measures of center (mean, median, and mode) and spread (range and interquartile range). Use these quantities to draw conclusions about the data collected and make predictions
7.D.1.2	Use reasoning with proportions to display and interpret data in circle graphs (pie charts) and histograms
7.D.1.3	Use technology to create and analyze box plots
7.D.2	Calculate and use proportional reasoning with probabilities to model and solve mathematical problems
7.D.2.1	Determine the theoretical probability of an event using the ratio between the size of the event and the size of the sample space; represent probabilities as percents, fractions and decimals between 0 and 1
7.D.2.2	Calculate probability as a fraction of sample space or as a fraction of area. Express probabilities as percents, decimals and fractions
7.D.2.3	Use proportional reasoning to draw conclusions about and predict relative frequencies of outcomes based on theoretical probabilities

7.GM | Oklahoma

Grade 7 expectations grouped under 7.GM.

7.GM.1	Develop and understand the concept of surface area and volume of rectangular prisms with rational-valued edge lengths
7.GM.1.1	Recognize that the surface area of a rectangular prism can be found by finding the area of each component of the net of that figure. Know that rectangular prisms of different dimensions can have the same surface area
7.GM.1.2	Using a variety of tools and strategies, develop the concept that surface area of a rectangular prism can be found by wrapping the figure with same-sized square units without gaps or overlap. Use appropriate measurements (e.g., cm2)
7.GM.1.3	Using a variety of tools and strategies, develop the concept that the volume of rectangular prisms can be found by counting the total number of same-sized unit cubes that fill a shape without gaps or overlaps. Use appropriate measurements (e.g., cm3)
7.GM.2	Use mathematical models and problems to calculate and justify the area of trapezoids and the area and perimeter of composite figures with rational measurements

7.GM.2.1	Develop and use the formula to determine the area of a trapezoid
7.GM.2.2	Find the area and perimeter of composite figures
7.GM.3	Use mathematical models and reasoning with proportions and ratios to determine measurements, justify formulas, and solve problems
7.GM.3.1	Solve problems that require the conversion of weights and capacities within the same measurement systems using appropriate units
7.GM.3.2	Demonstrate an understanding of the proportional relationship between the diameter and circumference of a circle and that the unit rate (constant of proportionality) is pi (π) and can be approximated by rational numbers such as22/7and 3.14
7.GM.3.3	Calculate the circumference and area of circles to solve problems in various contexts, in terms of pi (π) and using approximations for pi (π)
7.GM.4	Analyze the effect of translations, reflections, rotations, and dilations on the attributes of two-dimensional figures on and off the coordinate plane
7.GM.4.1	Describe the properties of similarity, compare geometric figures for similarity, and determine scale factors resulting from dilations
7.GM.4.2	Apply proportions, ratios, and scale factors to solve problems involving scale drawings and to determine side lengths and areas of similar triangles and rectangles
7.GM.4.3	Graph and describe translations (with directional and algebraic instructions), reflections across the x- and y-axes, and rotations in 90° increments about the origin of figures on a coordinate plane, and determine the coordinates of the vertices of a figure after a transformation

7.N | Oklahoma

Grade 7 expectations grouped under 7.N.

7.N.1	Read, write, represent, and compare rational numbers, expressed as integers, fractions, and decimals. Explain and apply the concept of absolute value
7.N.1.1	Compare and order rational numbers expressed in various forms using the symbols "<", ">", and "="
7.N.1.2	Recognize and generate equivalent representations of rational numbers, including equivalent fractions

Study Tips

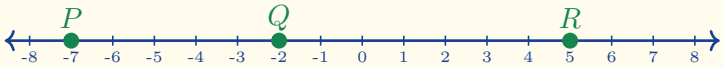
- ☞ Absolute value is **always** ≥ 0. It measures distance, and distance is never negative.
- ☞ A negative sign *outside* the bars is applied **after** taking the absolute value: $-|-5| = -(5) = -5$.
- ☞ Work from the inside out: simplify what is inside $|\cdot|$ first, then evaluate the absolute value, then apply any outside operations.

✍ Word Problems

16. Two submarines depart from a dock at sea level (depth $= 0$). Submarine A dives to a depth of -340 feet and Submarine B dives to a depth of -180 feet. Use absolute value to determine which submarine is *closer* to the surface, and by exactly how many feet closer it is than the other submarine.

17. Alena's bank account balance was \$0 on Sunday. By Monday evening her balance had dropped to $-\$47$. By Tuesday evening it had dropped further to $-\$62$. Use absolute value to state her Tuesday balance as a positive amount owed. Then determine by how many dollars her balance changed between Monday evening and Tuesday evening, and express that change as an absolute value.

18. Three points P, Q, R are marked on the number line shown here. Find $|P|$, $|Q|$, and $|R|$. Then determine which point is farthest from zero, and compute $|P| + |R|$ (the total distance from zero of the two outer points).



Scan Me

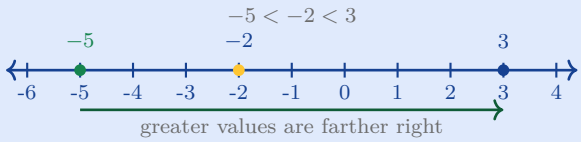
1.3 Comparing and Ordering Integers 7.N.1

The trick to comparing integers is to picture them on a number line. Numbers get larger as you move to the **right** and smaller as you move to the **left**. This is especially handy with negatives—for example, -3 is greater than -8 because -3 is closer to zero (farther right on the line). When a problem asks you to order integers from least to greatest, you are simply listing them in the same left-to-right order they appear on the number line. Once you have this picture in your head, symbols like $<$, $>$, and $=$ become second nature.

Key Concepts & Quick Review

Comparing: $a > b$ means a is to the **right** of b on the number line. $a < b$ means a is to the **left** of b.

Negatives rule: Among two negative integers, the one **closer to zero** is **greater**.
Ordering: list integers from least (leftmost) to greatest (rightmost).



Examples

① Compare -7 and -3. Write $<$, $>$, or $=$.

Think It Through: Put both numbers on a number line in your mind. The number -3 is closer to zero, so it sits to the right of -7. Numbers to the right are greater, and numbers to the left are smaller. Therefore $-7 < -3$.

Answer: $-7 < -3$

② Order from **least to greatest**: $4,\ -9,\ 2,\ -1,\ -6$.

Think It Through: Imagine placing all five integers on a number line. The farthest left is -9, then comes -6, then -1. After the negatives come the positives: 2 and then 4. Reading from left to right gives the order from least to greatest.

Answer: $-9 < -6 < -1 < 2 < 4$

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✎ Practice Problems

Write $<$, $>$, or $=$ in each box to make the statement true.

1. $-5 \square -2$ _____

2. $-8 \square -11$ _____

3. $7 \square -7$ _____

4. $-4 \square 0$ _____

5. $-15 \square -15$ _____

6. $-1 \square -100$ _____

7. $-9 \square 3$ _____

8. $|-6| \square 6$ _____

9. $-|-4| \square -4$ _____

10. $|-10| \square |-12|$ _____

11. $-20 \square -19$ _____

12. $0 \square -1$ _____

13. $-(-3) \square -3$ _____

14. $-|7| \square -7$ _____

15. $-25 \square -52$ _____

Study Tips

- ☞ Among two negative integers, the one with the **smaller absolute value** is **greater**: $-3 > -10$ because $3 < 10$.
- ☞ Any positive integer is always greater than any negative integer: $1 > -1{,}000{,}000$.
- ☞ When ordering a mixed set, negatives always come before zero, and zero comes before all positives.

✍ Word Problems

16. Five students competed in a math quiz bowl where correct answers earn points and incorrect answers lose points. Their final net scores were: -16, 8, -4, -21, and 5. Order the scores from *lowest to highest* and identify the student with the best score and the student with the worst score. Then find the range of scores (highest minus lowest).

_____

17. Four ocean animals are recorded at the following depths below the surface: a shark at -85 feet, a jellyfish at -12 feet, a sperm whale at -210 feet, and a yellowfin tuna at -47

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