y = mx + b

x^2 + 5x + 6 = 0

sqrt(x)

KANSAS KAP

7th GRADE MATH

MADE RIDICULOUSLY SIMPLE

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

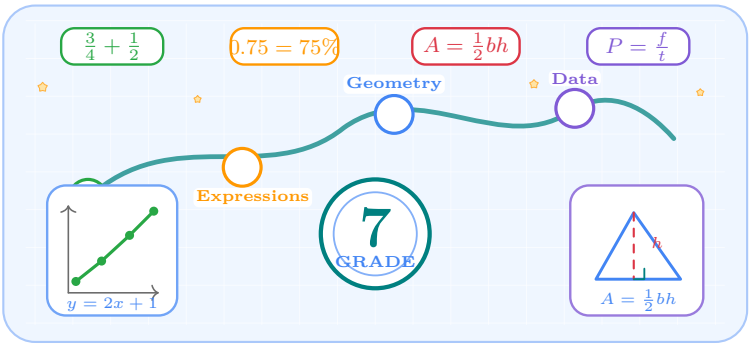
- COVERS ALL 7TH GRADE MATH STANDARDS
- EASY-TO-UNDERSTAND LESSONS & EXAMPLES
- PRACTICE QUESTIONS WITH DETAILED EXPLANATIONS
- TEST-TAKING STRATEGIES & TIPS
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Kansas KAP

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7.EE.4b Solve word problems leading to inequalities of the formpx+q>rorpx+q<rwherep,q, andrare specific rational numbers andp> 0. Graph the solution set of the inequality and interpret it in the context of the problem

7.G | Geometry

Draw, construct, and describe geometric figures and solve problems involving angle, area, and volume

7.G.1 Solve problems involving scale drawings of geometric figures, such as computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale

7.G.2 Identify three-dimensional objects generated by rotating a two-dimensional (rectangular or triangular) object around one edge

7.G.3 Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right cylinder

7.G.4 Use the formulas for the area and circumference of a circle and solve problems; give an informal derivation of the relationship between the circumference and area of a circle

7.G.5 Investigate the relationship between three-dimensional geometric shapes

7.G.6 Solve real-world and mathematical problems involving area of two-dimensional objects and volume and surface area of three-dimensional objects including cylinders and right prisms. (Solutions should not require students to take square roots or cube roots. For example, given the volume of a cylinder and the area of the base, students would identify the height.)

7.G.5a Generalize the volume formula for prisms and cylinders (V=BhwhereBis the base andhis the height)

7.G.5b Generalize the surface area formula for prisms and cylinders (SA= 2B+PhwhereBis the area of the base,Pis the perimeter of the base, andhis the height (in the case of a cylinder, perimeter is replaced by circumference))

7.NS | The Number System

Apply operations with rational numbers including integers, fractions, and decimals

7.NS.1	Represent addition and subtraction on a horizontal or vertical number line diagram
7.NS.2	Apply and extend previous understandings of multiplication and division of positive rational numbers to multiply and divide all rational numbers
7.NS.3	Solve and interpret real-world and mathematical problems involving the four operations with rational numbers. (Computations with rational numbers extend the rules for manipulating fractions to complex fractions.)
7.NS.1a	Describe situations in which opposite quantities combine to make 0. Show that a number and its opposite have a sum of 0 (are additive inverses)
7.NS.1b	Showp+qas the number located a distance |q| from p, in the positive or negative direction depending on whether q is positive or negative
7.NS.1c	Model subtraction of rational numbers as adding the additive inverse,p–q=p+(–q)
7.NS.1d	Model subtraction as the distance between two rational numbers on the number line where the distance is the absolute value of their difference
7.NS.1e	Apply properties of operations as strategies to add and subtract rational numbers
7.NS.2a	Describe how multiplication is extended from positive rational numbers to all rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (–1)(–1) = 1 and the rules for multiplying signed numbers
7.NS.2b	Explain that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. Leading to situations such that if p and q are integers, then –(p/q) = –p/q=p/–q
7.NS.2c	Apply properties of operations as strategies to multiply and divide rational numbers
7.NS.2d	Convert a rational number in the form of a fraction to its decimal equivalent using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats

7.RP | Ratios and Proportional Relationships

Analyze proportional relationships and use them to solve problems

7.RP.1	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units
7.RP.2	Recognize and represent proportional relationships between quantities:
7.RP.3	Use proportional relationships to solve multistep ratio and percent problems
7.RP.2a	Determine whether two quantities are in a proportional relationship, e.g. by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin
7.RP.2b	Analyze a table or graph and recognize that, in a proportional relationship, every pair of numbers has the same unit rate (referred to as the "m")
7.RP.2c	Represent proportional relationships by equations
7.RP.2d	Explain what a point (x,y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1,r) whereris the unit rate

7.SP | Statistics and Probability

Use random sampling to draw inferences and develop probability models

7.SP.1	Use statistics to gain information about a population by examining a sample of the population
7.SP.2	Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to informally gauge the variation in estimates or predictions
7.SP.3	Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability (requires introduction of mean absolute deviation)
7.SP.4	Use measures of center (mean, median and/or mode) and measures of variability (range, interquartile range and/or mean absolute deviation) for numerical data from random samples to draw informal comparative inferences about two populations

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

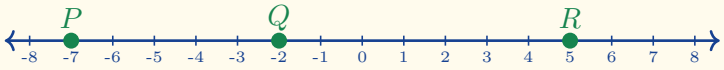
16. Two submarines depart from a dock at sea level (depth $= 0$). Submarine A dives to a depth of -340 feet and Submarine B dives to a depth of -180 feet. Use absolute value to determine which submarine is *closer* to the surface, and by exactly how many feet closer it is than the other submarine.

_____

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).



_____

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1.3 Comparing and Ordering Integers

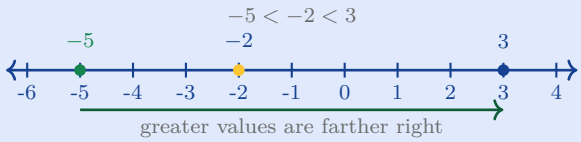
7.NS.1

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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