y = mx + b

x^2 + 5x + 6 = 0

sqrt(x)

TEXAS STAAR

7th GRADE MATH

MADE RIDICULOUSLY SIMPLE

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

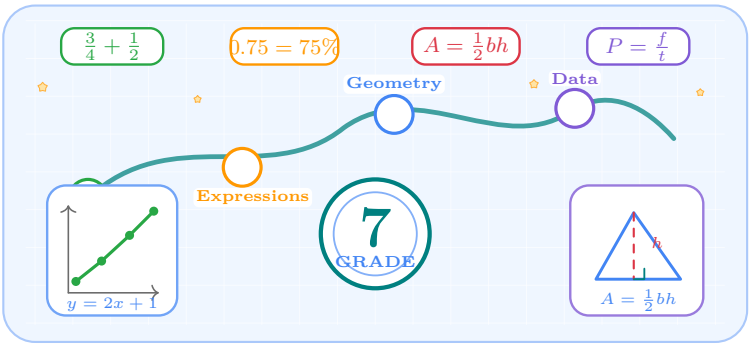
- COVERS ALL 7TH GRADE MATH STANDARDS
- EASY-TO-UNDERSTAND LESSONS & EXAMPLES
- PRACTICE QUESTIONS WITH DETAILED EXPLANATIONS
- TEST-TAKING STRATEGIES & TIPS
- BUILD CONFIDENCE. IMPROVE SCORES. SUCCEED!

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Texas STAAR

7th Grade Math Made Ridiculously Simple

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Reza Nazari

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7.2 The student applies mathematical process standards to represent and use rational numbers in a variety of forms. The student is expected to extend previous knowledge of sets and subsets using a visual representation to describe relationships between sets of rational numbers

7.3 | The student applies mathematical process standards to add, subtract, multiply, and...

The student applies mathematical process standards to add, subtract, multiply, and divide while solving problems and justifying solutions

7.3(A) add, subtract, multiply, and divide rational numbers fluently;

7.3(B) apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers

7.4 | The student applies mathematical process standards to represent and solve problems...

The student applies mathematical process standards to represent and solve problems involving proportional relationships

7.4(A) represent constant rates of change in mathematical and real-world problems given pictorial, tabular, verbal, numeric, graphical, and algebraic representations, including $d = rt$

7.4(B) calculate unit rates from rates in mathematical and real-world problems

7.4(C) determine the constant of proportionality ($k = y/x$) within mathematical and real-world problems

7.4(D) solve problems involving ratios, rates, and percents, including multi-step problems involving percent increase and percent decrease, and financial literacy problems;

7.4(E) convert between measurement systems, including the use of proportions and the use of unit rates

7.5 | The student applies mathematical process standards to use geometry to describe or...

The student applies mathematical process standards to use geometry to describe or solve problems involving proportional relationships

7.5(A)	generalize the critical attributes of similarity, including ratios within and between similar shapes
7.5(B)	describe π as the ratio of the circumference of a circle to its diameter;
7.5(C)	solve mathematical and real-world problems involving similar shape and scale drawings

7.6 | The student applies mathematical process standards to use probability and statistics...

The student applies mathematical process standards to use probability and statistics to describe or solve problems involving proportional relationships

7.6(A)	represent sample spaces for simple and compound events using lists and tree diagrams
7.6(B)	select and use different simulations to represent simple and compound events with and without technology
7.6(C)	make predictions and determine solutions using experimental data for simple and compound events
7.6(D)	make predictions and determine solutions using theoretical probability for simple and compound events
7.6(E)	find the probabilities of a simple event and its complement and describe the relationship between the two
7.6(F)	use data from a random sample to make inferences about a population
7.6(G)	solve problems using data represented in bar graphs, dot plots, and circle graphs, including part-to-whole and part-to-part comparisons and equivalents
7.6(H)	solve problems using qualitative and quantitative predictions and comparisons from simple experiments;

7.6(I) determine experimental and theoretical probabilities related to simple and compound events using data and sample spaces

7.7 The student applies mathematical process standards to represent linear relationships using multiple representations. The student is expected to represent linear relationships using verbal descriptions, tables, graphs, and equations that simplify to the form $y = mx + b$

7.8 | The student applies mathematical process standards to develop geometric relationships. . .

The student applies mathematical process standards to develop geometric relationships with volume

7.8(A) model the relationship between the volume of a rectangular prism and a rectangular pyramid having both congruent bases and heights and connect that relationship to the formulas

7.8(B) explain verbally and symbolically the relationship between the volume of a triangular prism and a triangular pyramid having both congruent bases and heights and connect that relationship to the formulas;

7.8(C) use models to determine the approximate formulas for the circumference and area of a circle and connect the models to the actual formulas

7.9 | The student applies mathematical process standards to solve geometric problems

The student applies mathematical process standards to solve geometric problems

7.9(A) solve problems involving the volume of rectangular prisms, triangular prisms, rectangular pyramids, and triangular pyramids

7.9(B) determine the circumference and area of circles

7.9(C) determine the area of composite figures containing combinations of rectangles, squares, parallelograms, trapezoids, triangles, semicircles, and quarter circles;

7.9(D) solve problems involving the lateral and total surface area of a rectangular prism, rectangular pyramid, triangular prism, and triangular pyramid by determining the area of the shape's net

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Examples

① Evaluate $-|-9|$.

Think It Through: Work from the inside out. First find the absolute value: $|-9| = 9$ because -9 is 9 units from zero. Then look at the negative sign outside the bars and apply it after the absolute value is finished. That gives $-(9) = -9$. A negative sign outside absolute value bars does not disappear.

Answer: -9

② Two hikers leave camp (position 0 on a trail). Hiker A walks 11 *mi* east $(+11)$ and Hiker B walks 11 *mi* west (-11). Use absolute value to compare the distances each hiker traveled. Then find $|+11| - |-11|$.

Think It Through: Absolute value tells distance from zero, so direction does not matter here. Hiker A traveled $|+11| = 11$ *mi* and Hiker B traveled $|-11| = 11$ *mi*. That means they are the same distance from camp even though they walked in opposite directions. Subtracting the two distances gives $11 - 11 = 0$.

Answer: 0; *both hikers traveled equal distances*

Practice Problems

Evaluate each expression.

1. $|-8| =$ _____

2. $|15| =$ _____

3. $-|-7| =$ _____

4. $|-34| =$ _____

5. $-|12| =$ _____

6. $|0| =$ _____

7. $|-23| =$ _____

8. $-|-20| =$ _____

9. $|-45| =$ _____

10. $|7| - |-7| =$ _____

11. $|-13| + |-8| =$ _____

12. $|-6| \cdot |-4| =$ _____

13. $|-3|^2 =$ _____

14. $|8 - 15| =$ _____

15. $|-100| \div |-25| =$ _____

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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

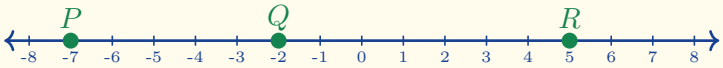
16. Two submarines depart from a dock at sea level (depth $= 0$). Submarine A dives to a depth of -340 feet and Submarine B dives to a depth of -180 feet. Use absolute value to determine which submarine is *closer* to the surface, and by exactly how many feet closer it is than the other submarine.

_____

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).



_____

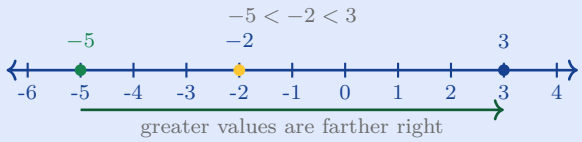
1.3 Comparing and Ordering Integers 7.3(B)

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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