y = mx + b

x^2 + 5x + 6 = 0

MAINE
THROUGH YEAR ASSESSMENT

sqrt(x)

7th GRADE MATH



MADE RIDICULOUSLY SIMPLE

A Comprehensive 7th Grade Math Study Guide to Acing the Through Year Assessment Test

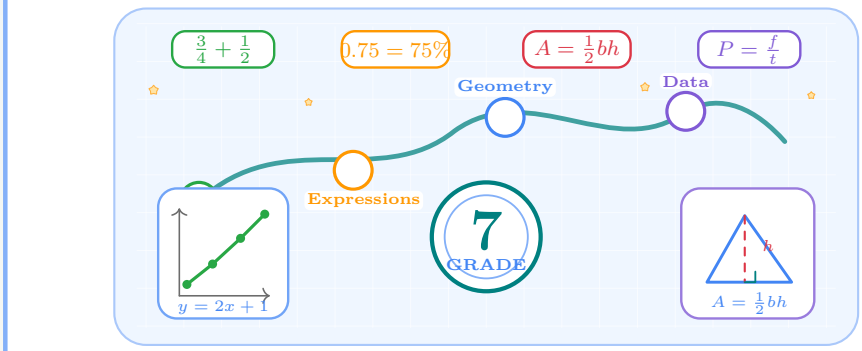
- COVERS ALL 7TH GRADE MATH STANDARDS
- EASY-TO-UNDERSTAND LESSONS & EXAMPLES
- PRACTICE QUESTIONS WITH DETAILED EXPLANATIONS
- TEST-TAKING STRATEGIES & TIPS
- BUILD CONFIDENCE. IMPROVE SCORES. SUCCEED!

LEARN SMART. PRACTICE MORE. ACE THE THROUGH YEAR ASSESSMENT!

Maine Through Year Assessment

7th Grade Math Made Ridiculously Simple

A Comprehensive 7th Grade Math Study Guide to Acing the Through Year Assessment Test



Reza Nazari

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7.EE.B.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation

7.EE.B.4 Use variables to represent quantities in a real-world or mathematical problem and construct simple equations and inequalities to solve problems by reasoning about the quantities

7.EE.B.4a Solve word problems leading to equations of the formpx+q=randp(x+q) =r, wherep,q, andrare specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?

7.EE.B.4b Solve word problems leading to inequalities of the formpx+q>rorpx+q<r, wherep,q, andrare specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make and describe the solutions

7.G | Maine

Grade 7 expectations grouped under 7.G.

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

7.G.A.2 Draw (freehand, with ruler and protractor, and with technology) two-dimensional geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle

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7.G.A.3	Describe the shape of the cross-section two-dimensional face of the figures that results from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids
7.G.B.4	Know that a circle is a two-dimensional shape created by connecting all the points equidistant from a fixed point called the center of the circle. Understand and describe the relationships among the radius, diameter, circumference and area of a circle. Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle
7.G.B.5	Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure
7.G.B.6	Solve real-world and mathematical problems involving area, volume and surface area of two- and/or three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms

7.GR | Maine

Grade 7 expectations grouped under 7.GR.

7.GR.EA.1	Solve real-world and mathematical problems involving angle measure, area, surface area, and volume
7.GR.EA.2	Draw, construct, and describe geometrical figures and describe the relationships between them

7.NS | Maine

Grade 7 expectations grouped under 7.NS.

7.NS.A.1	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram
7.NS.A.2	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers

7.NS.A.3	Solve 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.A.1a	Describe situations in which opposite quantities combine to make 0. For example, a hydrogen atom has a zero charge because its two constituents are oppositely charged
7.NS.A.1b	Understandp+qas the number located a distance |q| fromp, in the positive or negative direction depending on whetherqis positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts
7.NS.A.1c	Understand subtraction of rational numbers as adding the additive inverse,p-q=p+ (-q). Show that the distance between two rational numbers on the number line is the absolute value of their difference and apply this principle in real-world contexts
7.NS.A.1d	Apply properties of operations as strategies to add and subtract rational numbers
7.NS.A.2a	Understand that multiplication is extended from fractions to 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. Interpret products of rational numbers by describing real-world contexts
7.NS.A.2b	Understand 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. Ifpandqare integers, then -(p/q) = (-p)/q=p/(-q). Interpret quotients of rational numbers by describing real-world contexts
7.NS.A.2c	Apply properties of operations as strategies to multiply and divide rational numbers
7.NS.A.2d	Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats

7.QR | Maine

Grade 7 expectations grouped under 7.QR.

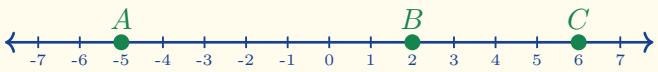
7.QR.EA.2	Analyze proportional relationships and use them to solve real-world and mathematical problems

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degrees did the temperature change from the afternoon high to the early-morning reading?

_____

18. Three points are plotted on the number line shown here. Identify the integer for each point, find the opposite of point B, and find the distance from point A to point C.



_____

1.2 Absolute Value

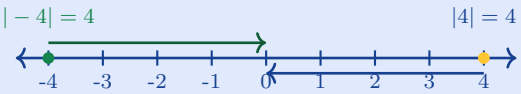
7.NS.A.1

Here is a simple but powerful idea: **absolute value** measures how far a number is from zero on the number line—not which side of zero it is on. That is why $|-7|$ and $|7|$ both equal 7; each sits exactly 7 units from zero. Because distance is never negative, an absolute value is always zero or positive. One common trap to watch for: if there is a minus sign outside the absolute-value bars, find the absolute value first, then apply the sign. Mastering this concept now will pay off every time you work with integer operations, distance, and real-world contexts like temperature change.

Key Concepts & Quick Review

Definition: $|n|$ = distance from n to 0 on the number line $\Rightarrow$ $|n| \geq 0$ always.

Rule: $|n| = n$ if $n \geq 0$; $|n| = -n$ if $n < 0$ **Key fact:** $|-n| = |n|$ (opposites have the same absolute value)



Absolute value is distance from zero.

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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

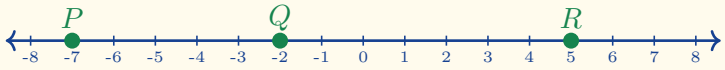
16. Two submarines depart from a dock at sea level (depth $= 0$). Submarine A dives to a depth of -340 feet and Submarine B dives to a depth of -180 feet. Use absolute value to determine which submarine is *closer* to the surface, and by exactly how many feet closer it is than the other submarine.

_____

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).



_____

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