y = mx + b

x^2 + 5x + 6 = 0

WISCONSIN FORWARD

7th GRADE MATH



MADE RIDICULOUSLY SIMPLE

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

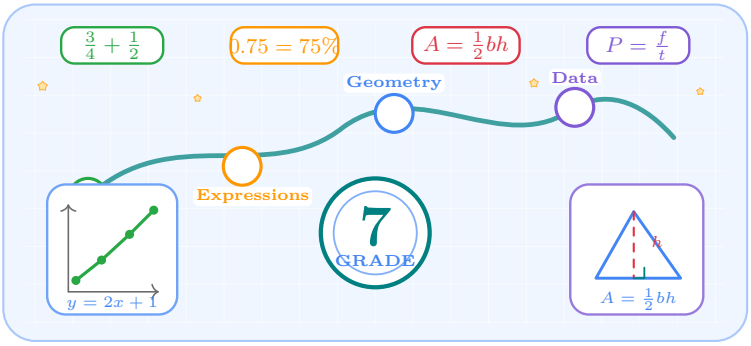
- COVERS ALL 7TH GRADE MATH STANDARDS
- EASY-TO-UNDERSTAND LESSONS & EXAMPLES
- PRACTICE QUESTIONS WITH DETAILED EXPLANATIONS
- TEST-TAKING STRATEGIES & TIPS
- BUILD CONFIDENCE. IMPROVE SCORES. SUCCEED!

LEARN SMART. PRACTICE MORE. ACE THE FORWARD!

Wisconsin FORWARD

7th Grade Math Made Ridiculously Simple

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



Reza Nazari

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7.G | Geometry

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

7.G.A	Draw, construct, and describe geometrical figures and describe the relationships between them
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) 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
7.G.A.3	Describe the two-dimensional figures that result from slicing three dimensional figures parallel to the base, as in plane sections of right rectangular prisms and right rectangular pyramids
7.G.B	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume. (M)
7.G.B.4	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 three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms

7.NS | The Number System

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

7.NS.A	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers

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
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. (Note: 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
7.NS.A.1b	Understand $p + q$ as the number located a distance $\|q\|$ from p, in the positive or negative direction depending on whether q is 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. If p and q are 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.RP | Ratios and Proportional Relationships

Analyze proportional relationships and use them to solve problems

7.RP.A	Analyze proportional relationships and use them to solve real-world and mathematical problems. (M)
7.RP.A.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.A.2	Recognize and represent proportional relationships between quantities
7.RP.A.3	Use proportional relationships to solve multi-step ratio and percent problems
7.RP.A.2a	Decide 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.A.2b	Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships
7.RP.A.2c	Represent proportional relationships by equations
7.RP.A.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 $(1, r)$ where r is the unit rate.

7.SP | Statistics and Probability

Use random sampling to draw inferences and develop probability models

7.SP.A	Use random sampling to draw inferences about a population. (M)
7.SP.A.1	Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences
7.SP.A.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 gauge the variation in estimates or predictions. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be
7.SP.B	Draw informal comparative inferences about two populations. (M)

1.1 Understanding Integers and the Number Line

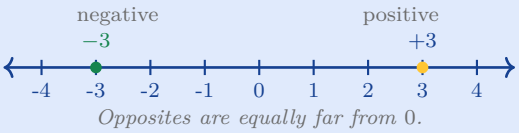
7.NS.A.1

Welcome to integer world! An **integer** is any whole number—positive, negative, or zero—and it tells you both an amount and a direction. Think of temperatures above or below zero, elevations above or below sea level, or money gained versus money lost—integers are everywhere. On a number line, positives sit to the **right** of zero and negatives sit to the **left**, and every integer has an opposite that is the same distance from zero in the other direction. Once you can picture this, comparing integers and working with them in addition, subtraction, and beyond gets much, much easier.

Key Concepts & Quick Review

Integers: $\{\ldots, -3, -2, -1, 0, 1, 2, 3, \ldots\}$ **Positive** integers are to the right of 0; **Negative** integers are to the left of 0.

Opposite of n: $-n$ **Opposite of $-n$:** $-(-n) = n$ **Zero:** neither positive nor negative



Opposites are equally far from 0.

Examples

① Write an integer for: "A submarine descends **300 feet below** sea level."

Think It Through: The key phrase here is *below sea level*. Sea level is our zero point, so anything below zero is negative. The number 300 tells us how far down the submarine is, and the negative sign tells us the direction. So 300 feet below sea level is written as -300.

Answer: -300

② Point A is located at -8 on the number line. Point B is the opposite of point A. What is the distance between points A and B?

Think It Through: Start by finding the opposite of -8. The opposite is 8, so point B is at 8. On the number line, point A is 8 units to the left of zero and point B is 8 units to the right of zero. Since the points are on opposite sides of zero, add those distances: $8 + 8 = 16$ units.

Answer: 16 *units*

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✎ Practice Problems

Simplify each expression.

1. $-(-6) =$ _____

2. $-(-14) =$ _____

3. $-(-(-3)) =$ _____

4. $-(-(-(-8))) =$ _____

5. $-(-25) =$ _____

6. $-(-(-11)) =$ _____

7. $-(-(-(-5))) =$ _____

8. $-(-19) =$ _____

9. $-(-(-7)) =$ _____

10. $-(-(-(-20))) =$ _____

11. $-(-33) =$ _____

12. $-(-(-(-(-4)))) =$ _____

13. $-(-(-16)) =$ _____

14. $-(-(-(-9))) =$ _____

15. $-(-42) =$ _____

Study Tips

- ☞ Two negatives always cancel: $-(-n) = n$. Count the minus signs — even count gives positive, odd count gives negative.
- ☞ The opposite of zero is zero: $-(0) = 0$.
- ☞ On any number line, moving **left** decreases the value; moving **right** increases it.

✍ Word Problems

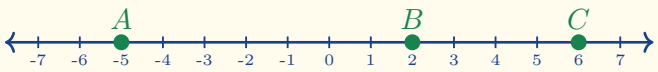
16. Marcus and his sister are playing a golf-themed board game where each player's score is tracked relative to par. Marcus's score is 5 strokes *under* par and his sister's score is 3 strokes *over* par. Write an integer for each score. In golf, the player with the *lower* score wins — who is winning, and by how many strokes? _____

17. A weather station records a high temperature of 12°F for one afternoon. That same night, the low temperature is the exact opposite of the afternoon high. During the early morning, the temperature drops an additional 7 degrees below the overnight low. Write an integer for the overnight low and for the early-morning temperature. By how many

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

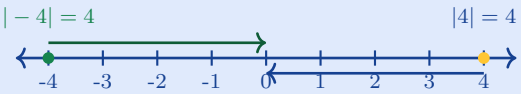
7.NS.A.1

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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