y = mx + b

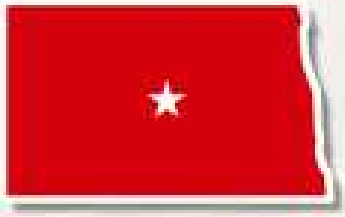
x^2 + 5x + 6 = 0

NORTH DAKOTA

sqrt(x)

NDSA

7th GRADE MATH



MADE RIDICULOUSLY SIMPLE

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

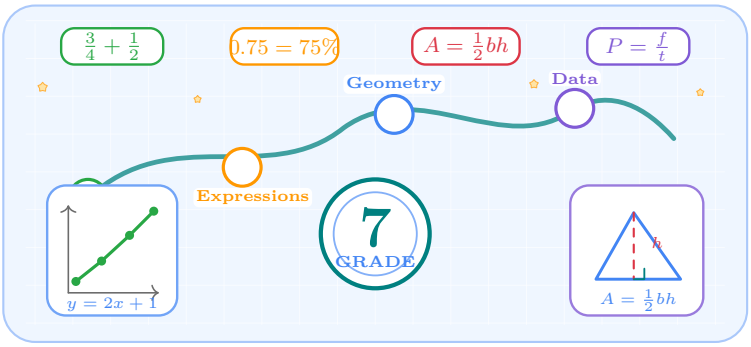
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North Dakota NDSA

7th Grade Math Made Ridiculously Simple

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



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7.AR.RP.3	Identify the constant of proportionality in tables, graphs, equations, diagrams, and descriptions of proportional relationships. Represent proportional relationships by an equation of the formy=kx, wherekis the constant of proportionality, and describe the meaning of each variable (y,k,x) in the context of the situation
7.AR.RP.4	Use proportional relationships to solve multi-step problems involving ratios, percents, and scale drawings of geometric figures, including authentic problems

7.DPS | Data, Probability, and Statistics

Use sampling, data analysis, and probability to draw conclusions

7.DPS.D	Analyze and interpret data using statistical methods
7.DPS.D.1	Identify the strengths and weaknesses of a population sample including bias in the process of the data collection
7.DPS.D.2	Analyze and draw inferences about a population using single and multiple random samples by using given measures of center and variability for the numerical data set
7.DPS.P	Develop and use probability models to find probabilities of events
7.DPS.P.1	Develop a probability model to find probabilities of theoretical events and contrast probabilities from an experimental model
7.DPS.P.2	Develop a probability model to find theoretical probabilities of independent compound events

7.GM | Geometry and Measurement

Solve problems involving angle measure, area, surface area, and volume

7.GM.AV	Solve problems involving area, surface area, and volume of geometric figures
7.GM.AV.1	Describe the relationship between the circumference and diameter of a circle (pi). Apply given formulas to calculate the area and circumference of a circle, including authentic problems

7.GM.AV.2	Calculate areas of polygons by composing and/or decomposing them into rectangles and triangles, including authentic problems. Solve problems involving the surface area of prisms and right pyramids using nets, including authentic problems
7.GM.AV.3	Solve problems involving the volume of prisms and composite solids, including authentic problems
7.GM.GF	Analyze properties of two- and three-dimensional geometric figures
7.GM.GF.1	Draw triangles from given conditions using appropriate tools. Defend whether a unique triangle, multiple triangles, or no triangle can be constructed when given three measures of angles or sides
7.GM.GF.2	Describe the following angle-pair relationships: supplementary angles, complementary angles, vertical angles, and adjacent angles. Solve for an unknown angle in a figure by applying facts about these angles

7.NO | Number and Operations

Understand and apply properties of operations with rational numbers

7.NO.NS	Apply operations with rational numbers including integers, fractions, and decimals
7.NO.NS.1	Describe the absolute value of a number as its distance from zero on a number line
7.NO.NS.2	Recognize common fractions and decimal equivalencies up to a denominator of 10. Convert a rational number to a decimal using technology
7.NO.O	Apply operations with rational numbers fluently
7.NO.O.1	Add, subtract, multiply, and divide integers using visual models and properties of operations in multi-step problems, including authentic problems
7.NO.O.2	Add, subtract, multiply, and divide non-negative fractions in multi-step problems, including authentic problems
7.NO.O.3	Add, subtract, multiply, and divide non-negative decimals to the hundredth place in multi-step problems using strategies or procedures, including authentic problems

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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).

_____

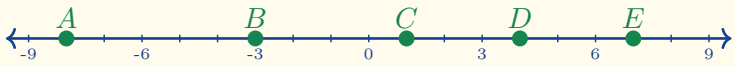
17. Four ocean animals are recorded at the following depths below the surface: a shark at -85 feet, a jellyfish at -12 feet, a sperm whale at -210 feet, and a yellowfin tuna at -47

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feet. Order the animals from *shallowest* to *deepest* depth. How much deeper is the sperm whale than the shark?

_____

18. Five points are plotted on the number line shown here. Identify the integer at each point, then list the points in order from least to greatest. Which point has the greatest absolute value?



_____

1.4 Adding Integers

7.NO.NS.1

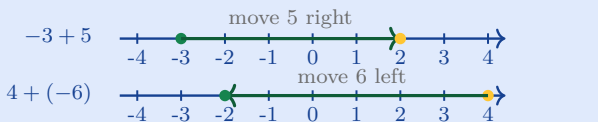
Think of adding integers as combining movements on a number line—or combining gains and losses in everyday life. Here is the key: when both numbers share the same sign, they move in the same direction, so you add the absolute values and keep that sign. When the signs are different, the numbers pull in opposite directions; you subtract the smaller absolute value from the larger one and keep the sign of whichever was stronger. You will also meet **zero pairs** (additive inverses), which show why a positive and its matching negative cancel out completely. Master these two rules and integer addition will feel natural every time.

Key Concepts & Quick Review

Same signs: Add the absolute values; keep the common sign. **Example:** $(-5)+(-8)=-(5+8)=-13$

Different signs: Subtract the smaller $|\cdot|$ from the larger; keep the sign of the larger $|\cdot|$.
Example: $(-9)+4=-(9-4)=-5$

Additive inverse: $a+(-a)=0$ **Identity:** $a+0=a$



Positive addends move right; negative addends move left.

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Examples

① Evaluate $(-13) + 7$.

Think It Through: The signs are different, so subtract the smaller absolute value from the larger one. That gives $13 - 7 = 6$. Now decide the sign by looking at which number has the larger absolute value. Since 13 is larger than 7, the negative number wins. So the sum is -6.

Answer: -6

② A hiker starts at 240 feet above sea level, descends 380 feet, then climbs back up 95 feet. What is the hiker's final elevation?

Think It Through: Translate the changes into integers: $240 + (-380) + 95$. First combine 240 and -380. Because the signs are different, subtract $380 - 240 = 140$ and keep the sign of the larger absolute value, which is negative, so the result is -140. Then add 95: $-140 + 95 = -45$. The final elevation is -45 feet, which means 45 feet below sea level.

Answer: -45 *feet*

Practice Problems

Find each sum.

1. $5 + (-8) =$ _____

2. $(-6) + (-9) =$ _____

3. $(-12) + 7 =$ _____

4. $(-3) + 15 =$ _____

5. $(-14) + (-6) =$ _____

6. $8 + (-8) =$ _____

7. $(-25) + 13 =$ _____

8. $(-9) + (-11) =$ _____

9. $17 + (-24) =$ _____

10. $(-30) + 45 =$ _____

11. $(-7) + (-7) + 4 =$ _____

12. $12 + (-5) + (-9) =$ _____

13. $(-20) + (-15) + 30 =$ _____

14. $(-6) + 13 + (-4) =$ _____

15. $36 + (-49) =$ _____

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