

Alaska AK STAR Grade 8 Math Quizzes

Quick Topic Assessments with Answer Key

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*10–15 minutes
per quiz*



Score It

*Check every answer
in the key*



Review & Retry

*Study what you missed
then quiz again*

CHAPTER

1

Irrational Numbers

★ *What's Inside* ★

Quiz 1: Real Number Subsets 3



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CHAPTER 1

Quiz 1

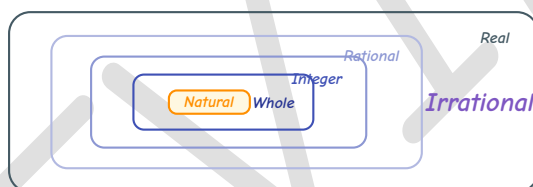
Real Number Subsets

Name: _____

Date: _____

★ Score: _____ / 8

- 1 Which set of subsets does $\sqrt{49}$ belong to?
- A. Irrational, Real
B. Natural, Whole, Integer, Rational, Real
C. Integer, Rational, Real
D. Whole, Integer, Rational, Real
- 2 The diagram shows the real number subsets nested inside each other. In which **innermost** (most specific) region does 0 belong?



Natural

Whole

Integer

Rational

- 3 True or False: Every integer is a rational number.

True

False

- 4 Classify each number. Write **Y** (yes) or **N** (no) in each blank.

Number	Natural	Whole	Integer	Rational
-8	___	___	___	___
$\frac{2}{3}$	___	___	___	___
7	___	___	___	___



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- 5 A student classified $-\frac{5}{2}$ as shown on the card below. Find and explain the **error**.

Student's work: " $-\frac{5}{2}$ is negative, so it is an **integer**. It is also rational and real."

Show your work

- 6 A scientist measures a sample's weight as $0.\overline{3}$ grams. She classifies it as an **integer**. Is she correct?

- Yes, it is an integer
 No, it is rational but not an integer
 No, it is irrational
 No, it is a whole number

Bonus Challenge

This is a bonus question for extra credit. Give it your best attempt.

- 7 From the set $\{-8, 0, \sqrt{11}, \pi, \sqrt{49}, 0.\overline{3}\}$, find the **one** number that fits **all** three clues.

- **Clue 1:** I am a real number.
- **Clue 2:** I am **not** rational.
- **Clue 3:** I am the square root of a whole number.

Show your work

Score Summary

I got _____ out of _____ correct.



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CHAPTER

2

Lines and Linear Equations

★ What's Inside ★

Quiz 2: Graphing Proportional Relationships	7
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 CHAPTER 3

Quiz 2

Graphing Proportional Relationships

 Name: _____

 Date: _____

 Score: _____ / 8

- 1 The graph shows a proportional relationship. What is the **constant of proportionality** (k)?



A. 3

B. 2

C. 6

D. $\frac{1}{2}$

- 2 Complete the table for a proportional relationship.

Time (h)	1	3	5
Distance (mi)	8	_____	_____

- 3 True or False: The equation $y = 5x + 2$ represents a **proportional relationship**.

True False

- 4 Compare the **unit rates** (gallons per minute). Circle $>$, $<$, or $=$.



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Pipe A: 36 gal in 4 min **Pipe B: 50 gal in 5 min**

- 5 A proportional relationship passes through $(5, 20)$. Write the equation in the form $y = kx$.

Equation: _____

- 6 A car uses gas at a constant rate: 2 gallons for every 50 miles. How many gallons does it need for 175 miles?

Gallons: _____

Bonus Challenge

This is a bonus question for extra credit. Give it your best attempt.

- 7 Store A sells fruit for $y = 3x$ (dollars per pound). Store B's prices: 2 lb costs \$5, 4 lb costs \$10. Which store is cheaper, and how much would 10 pounds cost there? Show your work.

 Show your work

Score Summary

I got _____ out of _____ correct.



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Answer Key & Explanations



Answer Key

First try each quiz on your own, then check your work here.

Chapter 1

Quiz 1: Real Number Subsets

1 B (Natural, Whole, Integer, Rational, Real)

2 B (Whole)

3 True

4 See explanation

5 $-\frac{5}{2}$ is NOT an integer

6 B (No, it is rational but not an integer)

7 $\sqrt{11}$

Explanations

1 $\sqrt{49} = 7$ because $7 \times 7 = 49$. Since 7 is a counting number, it sits inside **every** subset: $\text{Natural} \subset \text{Whole} \subset \text{Integer} \subset \text{Rational} \subset \text{Real}$. Choice D forgets Natural; choice C also forgets Whole. Common mistake: assuming all square roots are irrational — perfect squares like 49 give whole-number roots. ✓

2 0 belongs to $\text{Whole} = \{0, 1, 2, 3, \dots\}$, but 0 is **not** a Natural number (naturals start at 1). Because $\text{Whole} \subset \text{Integer} \subset \text{Rational} \subset \text{Real}$, the number 0 is also an integer, rational, and real — but its most specific subset is **Whole**. ✓



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3 Every integer n can be written as $\frac{n}{1}$, a fraction of two integers with a non-zero denominator. For example, $-3 = \frac{-3}{1}$ and $0 = \frac{0}{1}$. Therefore $\text{Integer} \subset \text{Rational}$. Common mistake: thinking only “fractions” like $\frac{2}{3}$ are rational. All integers are rational too! ✓

4 -8 : N, N, Y, Y — negative, so not natural or whole, but it **is** an integer and rational ($\frac{-8}{1}$). $\frac{2}{3}$: N, N, N, Y — a fraction that does not equal a whole number, so only rational (and real). 7: Y, Y, Y, Y — a counting number belongs to **every** listed subset because $\text{Natural} \subset \text{Whole} \subset \text{Integer} \subset \text{Rational}$. ✓

5 $-\frac{5}{2} = -2.5$, which is **not** a whole-number value, so it is not an integer. Integers are $\{\dots, -2, -1, 0, 1, 2, \dots\}$ — no fractions or decimals between them. The student confused “negative” with “integer.” Not all negative numbers are integers! $-\frac{5}{2}$ is rational and real, but not natural, whole, or integer. ✓

6 $0.\overline{3} = \frac{1}{3}$, a repeating decimal, so it is **rational**. But $\frac{1}{3}$ is not a whole-number value, so it is not an integer (and not whole or natural either). It is rational and real only. Common mistake: thinking repeating decimals are irrational because they “go on forever.” Repeating = rational; only non-repeating, non-terminating decimals are irrational. ✓

7 Clue 1 keeps all six numbers (all are real). Clue 2 means irrational: only $\sqrt{11}$ and π remain. Clue 3: $\sqrt{11}$ is the square root of 11 (a whole number) ✓, but π is **not** the square root of any whole number, so π is eliminated. The answer is $\sqrt{11} \approx 3.317$. It is irrational (since 11 is not a perfect square), real, and the square root of a whole number. ✓

Chapter 2

Quiz 2: Graphing Proportional Relationships

1 B (2)

2 24 and 40

3 False

4 <

5 $y = 4x$

6 7



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7 Store B; \$25

 Explanations

1 For a proportional relationship $y = kx$, pick any point on the line: $k = \frac{y}{x} = \frac{6}{3} = 2$. Common mistake: choosing $k = 3$ (the x -value) or $k = 6$ (the y -value) instead of dividing $y \div x$. ✓

2 The unit rate is $k = 8$ miles per hour. At 3 h: $8 \times 3 = 24$ mi. At 5 h: $8 \times 5 = 40$ mi. In a proportional table, multiply each x -value by k . ✓

3 A proportional relationship has the form $y = kx$ and passes through the origin $(0, 0)$. The equation $y = 5x + 2$ has a y -intercept of 2, so at $x = 0$ we get $y = 2$, not 0. That extra $+2$ means it is **not** proportional. ✓

4 Pipe A: $\frac{36}{4} = 9$ gal/min. Pipe B: $\frac{50}{5} = 10$ gal/min. Since $9 < 10$, Pipe A's rate is **less than** Pipe B's rate. Common mistake: comparing totals (36 vs 50) instead of unit rates. ✓

5 Find k : $k = \frac{y}{x} = \frac{20}{5} = 4$. So the equation is $y = 4x$. Check: $y = 4(5) = 20$. ✓

6 Unit rate: $\frac{2}{50} = 0.04$ gal/mi (or $\frac{50}{2} = 25$ mi/gal). For 175 mi: $175 \div 25 = 7$ gallons. Alternatively, set up a proportion: $\frac{2}{50} = \frac{x}{175}$, so $x = \frac{2 \times 175}{50} = 7$. ✓

7 Store A: $k = 3$ (\$3/lb). Store B: $k = \frac{5}{2} = 2.50$ (\$2.50/lb). Since $\$2.50 < \3.00 , Store B is cheaper. At 10 lb: $10 \times 2.50 = \$25$. Check Store A: $10 \times 3 = \$30$ — that's \$5 more. ✓



Well done checking your answers!

Keep practicing to strengthen your skills.

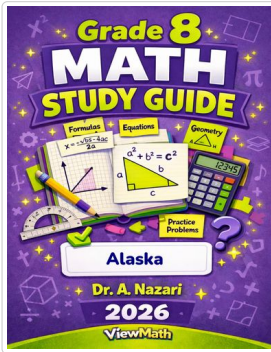


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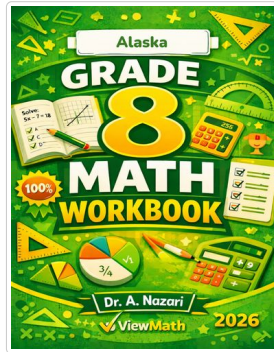
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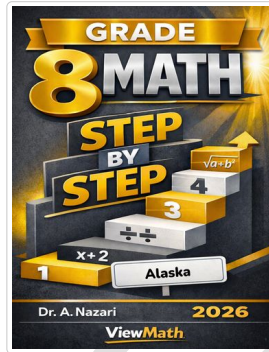
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Workbook



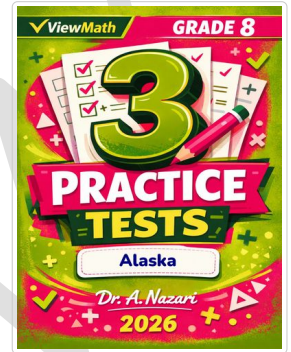
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Step-by-Step



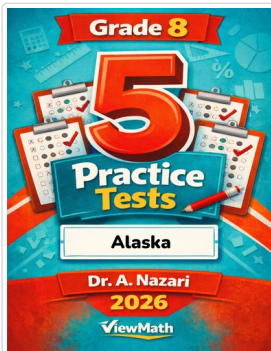
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3 Practice Tests



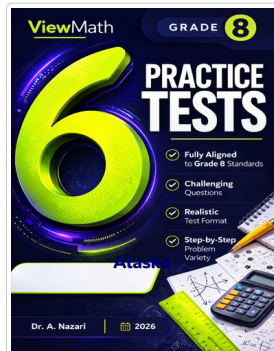
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5 Practice Tests



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6 Practice Tests



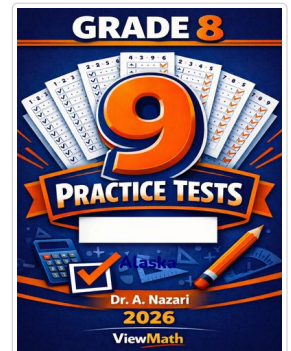
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7 Practice Tests



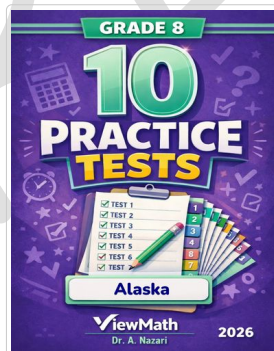
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9 Practice Tests



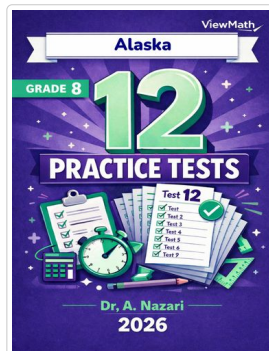
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10 Practice Tests



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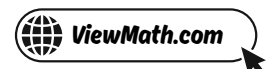
12 Practice Tests



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