Washington WA Standards Grade 8 Math Summer Review

8-Week Review with Practice and Weekly Quizzes

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Published by View Math Education

ViewMath.com

Grade 8 Summer Math Review

8-week core review with practice and weekly quizzes

This 8-week plan reviews the Grade 8 math students already learned this year.

How each week works

- Monday through Thursday are short review days.
- Each day starts with a Lesson Review.
- Each practice day has 6 problems.
- Friday is a 10-question quiz.
- Answers explain the thinking, not just the final number.

Complete the questions before checking the answer key.

Your 8-Week Summer Review Plan

Use this book four days a week, then take the quiz on Friday.

Weekly Schedule

Week	Monday	Tuesday	Wednesday	Thursday	Friday
1	Day 1	Day 2	Day 3	Day 4	Quiz
2	Day 1	Day 2	Day 3	Day 4	Quiz
3	Day 1	Day 2	Day 3	Day 4	Quiz
4	Day 1	Day 2	Day 3	Day 4	Quiz
5	Day 1	Day 2	Day 3	Day 4	Quiz
6	Day 1	Day 2	Day 3	Day 4	Quiz
7	Day 1	Day 2	Day 3	Day 4	Quiz
8	Day 1	Day 2	Day 3	Day 4	Final Quiz

For students

Read the Lesson Review first. Try all 6 problems before checking answers. If you miss one, read the explanation and fix your work.

For parents and teachers

The daily pages are meant to be short. If a student struggles, use the answer explanation as the teaching step, then have the student correct the problem.

Goal

By the end of 8 weeks, students will have completed 192 daily practice problems and 80 quiz questions, with review across the full Grade 8 math year.

Summer Progress Tracker

Check off each day as you finish it.

Week	Mon	Tue	Wed	Thu	Fri Quiz
1	☐	☐	☐	☐	☐
2	☐	☐	☐	☐	☐
3	☐	☐	☐	☐	☐
4	☐	☐	☐	☐	☐
5	☐	☐	☐	☐	☐
6	☐	☐	☐	☐	☐
7	☐	☐	☐	☐	☐
8	☐	☐	☐	☐	☐

Small practice adds up.

Four short days and one quiz each week is enough to keep Grade 8 math fresh all summer.

Grade 8 Reference Sheet

High-yield formulas and reminders for quick review

Exponents

$a^m \cdot a^n = a^{m+n}$

$\frac{a^m}{a^n} = a^{m-n}$

$(a^m)^n = a^{mn}$

$(ab)^n = a^n b^n$

$a^0 = 1$ for $a \neq 0$

$a^{-n} = \frac{1}{a^n}$

Scientific Notation

$a \times 10^n$, where $1 \leq |a| < 10$

Multiply: multiply decimals, add exponents.

Divide: divide decimals, subtract exponents.

Positive exponent: number is large.

Negative exponent: number is small.

Roots and Real Numbers

Perfect squares: $1, 4, 9, 16, 25, 36$

$49, 64, 81, 100, 121, 144$

Perfect cubes: $1, 8, 27, 64, 125$

$\sqrt{2} \approx 1.414$, $\sqrt{3} \approx 1.732$, $\pi \approx 3.14159$

Irrational numbers are nonrepeating, nonterminating decimals.

Slope and Lines

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\text{rise}}{\text{run}}$

Slope-intercept form: $y = mx + b$

m is slope, b is the y-intercept.

Proportional relationship: $y = mx$ and graph passes through $(0, 0)$.

Systems of Equations

A solution is the point where two graphs meet.

One solution: different slopes.

No solution: same slope, different intercepts.

Infinitely many solutions: same line.

Use substitution or elimination to solve exactly.

Functions

Each input has exactly one output.

Use the vertical line test on graphs.

Linear functions have a constant rate of change.

In $y = mx + b$, the initial value is b.

Compare functions by rate of change and initial value.

Transformations

Translation: slide. Reflection: flip. Rotation: turn.

These rigid motions keep lengths and angle measures.

Dilation: resize by scale factor k.

$k > 1$ enlarges; $0 < k < 1$ reduces.

Congruent figures are same size and shape. Similar figures have proportional sides.

Angle Relationships

Triangle angle sum: 180°

Exterior angle = sum of the two remote interior angles.

Vertical angles are congruent.

With parallel lines, alternate interior angles are congruent.

Same-side interior angles sum to 180°.

Pythagorean Theorem

For a right triangle, $a^2 + b^2 = c^2$.

c is the hypotenuse, the longest side.

Distance formula: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Use the theorem to check whether a triangle is right.

Volume

Cylinder: $V = \pi r^2 h$

Cone: $V = \frac{1}{3}\pi r^2 h$

Sphere: $V = \frac{4}{3}\pi r^3$

Use the same cubic unit as the dimensions.

If dimensions scale by k, volume scales by k^3.

Scatter Plots

Positive association: points trend upward.

Negative association: points trend downward.

No association: no clear pattern.

A line of fit models the trend.

Slope describes the average rate of change.

Two-Way Tables

Rows and columns group categorical data.

Relative frequency = part divided by total.

Use row, column, or table totals depending on the question.

Compare percentages, not just counts.

Variability and Probability

Mean absolute deviation measures typical distance from the mean.

$\text{MAD} = \frac{\text{sum of absolute deviations}}{\text{number of values}}$

Probability: $0 \leq P(\text{event}) \leq 1$

Experimental probability uses results. Theoretical probability uses equally likely outcomes.

WEEK 1

The Number System

This Week's Days

Week 1 Day 1

Rational and Irrational Numbers

A rational number can be written as $\frac{a}{b}$, where a and b are integers and $b \neq 0$. Irrational numbers cannot be written that way.

- Integers, fractions, terminating decimals, and repeating decimals are rational.
- A decimal that never terminates and never repeats is irrational.
- $\sqrt{n}$ is rational when n is a perfect square, such as 25 or 64.
- To convert $0.\overline{ab}$, multiply by 100, subtract, and solve for the fraction.
- Always check whether a square root simplifies before classifying it.

Use the decimal pattern or fraction form as evidence for the classification.

Practice

1. Classify $\sqrt{49}$ as rational or irrational. _____

2. Classify $\sqrt{18}$ as rational or irrational. _____

3. Convert $0.\overline{6}$ to a fraction. _____

4. Convert $0.2\overline{7}$ to a fraction. _____

5. Which number is irrational?

A. $\frac{11}{4}$ **B.** $\sqrt{36}$

C. π **D.** $0.\overline{18}$

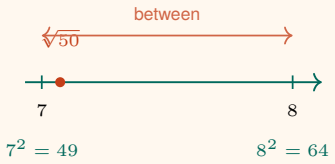
6. True or False: Every repeating decimal is rational. ☐ True ☐ False

Week 1 Day 2 Estimating Irrational Numbers

Estimate square roots by trapping the number between nearby perfect squares. Then decide which endpoint it is closer to.

- If $a^2 < n < b^2$, then $\sqrt{n}$ is between a and b.
- Perfect squares such as $49, 64, 81, 100, 121$ are useful landmarks.
- Use a number line to compare an irrational number with decimals or fractions.
- For a nearest tenth estimate, test tenths by squaring them.
- Estimates should make sense: $\sqrt{80}$ is near 9, not near 40.

The square root symbol asks, 'What number squared gives this value?'



Practice

1. $\sqrt{50}$ is between which two whole numbers? _____

2. Estimate $\sqrt{120}$ to the nearest whole number. _____

3. Estimate $\sqrt{20}$ to the nearest tenth. _____

4. Fill in $<$, $>$, or $=$. $\sqrt{30}$ ____ 5.4

5. Which is the best estimate for $\sqrt{2}$?

A. 0.7 **B.** 1.4

C. 2.2 **D.** 4.0

6. A square garden has area 70 ft^2. Estimate its side length to the nearest tenth.

Week 1 Quiz

Number System Check

Name: _____ Date: _____ Score: _____/10

1. Which number is irrational?

A. $\sqrt{81}$ **B.** -4

C. $\sqrt{7}$ **D.** 0.25

2. Convert $0.\overline{4}$ to a fraction. _____

3. Estimate $\sqrt{90}$ to the nearest whole number. _____

4. True or False: $\sqrt{64}$ is irrational because it has a radical sign. ☐ True ☐ False

5. Simplify $(a^2)(a^5)$. _____

6. Write 3^{-3} with a positive exponent. _____

7. Order from least to greatest: $\sqrt{20},\ 4.6,\ \sqrt{30}$.

8. Estimate $3 + \sqrt{28}$ to the nearest tenth. _____

9. Which expression equals 10^2?

A. $\dfrac{10^5}{10^3}$ **B.** $10^5 \cdot 10^3$

C. $(10^2)^2$ **D.** 10^{-2}

10. A square has area 48 ft^2. Is its side length rational or irrational?

WEEK

2

Proportional Graphs

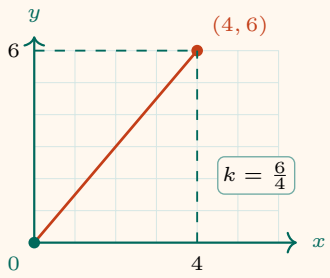
This Week's Days

Week 2 Day 4 Graphing Proportional Relationships

A proportional relationship has the form $y = kx$. Its graph is a straight line through the origin, and k is the constant of proportionality.

- The ratio $\frac{y}{x}$ stays the same for every nonzero x.
- The graph must pass through $(0, 0)$.
- The constant k is also the slope of the line.
- Tables, equations, and graphs can all show the same relationship.
- If an equation has an added constant, such as $y = 3x + 2$, it is not proportional.

Look for both clues: constant ratio and a graph through the origin.



Practice

1. In a table, $x = 2, 4, 6$ and $y = 5, 10, 15$. What is the constant of proportionality?

2. A proportional graph contains the point $(8, 12)$. What is the unit rate?

3. Does a line through $(0, 0)$ and $(3, 7)$ show a proportional relationship? _____

4. Which equation represents a proportional relationship?

A. $y = 4x$ **B.** $y = 4x + 1$

C. $y = x - 4$ **D.** $y = 4$

5. If $y = 18$ when $x = 6$ in a proportional relationship, what is y when $x = 10$?

6. True or False: $y = x + 2$ is proportional because it is a line. ☐ True ☐ False

WEEK

6

Geometry and the Pythagorean Theorem

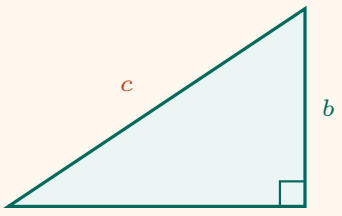
This Week's Days

Week 6 Day 4 The Pythagorean Theorem

In a right triangle, the legs a and b and hypotenuse c satisfy $a^2 + b^2 = c^2$. The hypotenuse is always the longest side.

- Use $a^2 + b^2 = c^2$ to find a missing hypotenuse.
- Use $c^2 - a^2 = b^2$ to find a missing leg.
- The converse checks whether three side lengths form a right triangle.
- Always put the longest side in the c position.
- Round only at the end when an answer is not exact.

The theorem works only for right triangles.



$\boldsymbol{a^2 + b^2 = c^2}$
longest side $= c$

Practice

1. A right triangle has legs 5 and 12. Find the hypotenuse.

2. A right triangle has hypotenuse 17 and one leg 8. Find the other leg.

3. Do side lengths $7, 24, 25$ form a right triangle?

4. A ladder is 10 ft long and its foot is 4 ft from a wall. How high does it reach? Round to the nearest tenth.

5. Do side lengths $6, 8, 11$ form a right triangle?

6. A rectangular box is 3 cm by 4 cm by 12 cm. Find the space diagonal.

Answer Key & Explanations

Check each answer, then use the explanations to correct missed work.

Week 1 Day 1 Rational and Irrational Numbers

1	2	3	4	5	6
Rational	Irrational	$\frac{2}{3}$	$\frac{5}{18}$	C	True

Explanations

1. $\sqrt{49} = 7$, and 7 can be written as $\frac{7}{1}$. A number that can be written as a ratio of integers is rational.

2. 18 is not a perfect square, so $\sqrt{18}$ does not simplify to an integer or fraction. Its decimal continues without repeating, which makes it irrational.

3. Let $x = 0.\overline{6}$, so $10x = 6.\overline{6}$. Subtract to get $9x = 6$, so $x = \frac{6}{9} = \frac{2}{3}$.

4. Let $x = 0.2777\ldots$. Then $100x = 27.777\ldots$ and $10x = 2.777\ldots$, so $90x = 25$ and $x = \frac{25}{90} = \frac{5}{18}$.

5. π has a decimal that does not terminate or repeat. The other choices are a fraction, a perfect-square root, and a repeating decimal, so they are rational.

6 A repeating decimal can be converted to a fraction by multiplying by a power of 10 and subtracting. Because it can be written as a ratio of integers, it is rational.

Week 1 Day 2 Estimating Irrational Numbers

1 7 and 8	2 11	3 4.5	4 $>$	5 B	6 8.4 ft

Explanations

1 Since $7^2 = 49$ and $8^2 = 64$, 50 lies between those perfect squares. Therefore $\sqrt{50}$ is between 7 and 8, and it is very close to 7.

2 120 is between $100 = 10^2$ and $121 = 11^2$. It is much closer to 121, so $\sqrt{120}$ rounds to 11.

3 $4.4^2 = 19.36$ and $4.5^2 = 20.25$. Since 20 is closer to 20.25, $\sqrt{20}$ is about 4.5.

4 $5.4^2 = 29.16$, which is less than 30. Since the square is too small, $\sqrt{30}$ must be greater than 5.4.

5 $1^2 = 1$ and $2^2 = 4$, so $\sqrt{2}$ must be between 1 and 2. The nearest tenth is about 1.4, so choice B is best.

6 The side length is $\sqrt{70}$ because area of a square is s^2. Since $8.4^2 = 70.56$, the side length is about 8.4 ft.

Week 1 Quiz Number System Check

1 C | 2 $\frac{4}{9}$ | 3 9 | 4 False | 5 a^7 | 6 $\frac{1}{27}$ | 7 $\sqrt{20},\ 4.6,\ \sqrt{30}$ | 8 8.3

9 A | 10 Irrational

Explanations

1. 7 is not a perfect square, so $\sqrt{7}$ is irrational. The other numbers can be written as fractions.

2. Let $x = 0.\overline{4}$, so $10x = 4.\overline{4}$. Subtract to get $9x = 4$, so $x = \frac{4}{9}$.

3. 90 is between $81 = 9^2$ and $100 = 10^2$. It is closer to 81, so $\sqrt{90}$ rounds to 9.

4. $\sqrt{64} = 8$, which is an integer. A radical can still be rational when the radicand is a perfect square.

5. Multiplying powers with the same base means add exponents. $2 + 5 = 7$, so the product is a^7.

6. A negative exponent means move the power to the denominator. Since $3^3 = 27$, $3^{-3} = \frac{1}{3^3} = \frac{1}{27}$.

7. $\sqrt{20} \approx 4.5$, and $\sqrt{30} \approx 5.5$. Therefore the order is $\sqrt{20}$, 4.6, $\sqrt{30}$.

8. $\sqrt{28} \approx 5.3$ because it is between $\sqrt{25}$ and $\sqrt{36}$. Then $3 + 5.3 = 8.3$.

9. Using the quotient rule, $10^5/10^3 = 10^{5-3} = 10^2$. The other choices give different powers.

10 The side length is $\sqrt{48} = 4\sqrt{3}$. Since $\sqrt{3}$ is irrational, the side length is irrational.

Week 2 Day 4 Graphing Proportional Relationships

1 2.5	2 1.5	3 Yes	4 A	5 30	6 False

Explanations

1 Divide y by x for each pair: $5/2 = 10/4 = 15/6 = 2.5$. The constant of proportionality is $k = 2.5$.

2 For a proportional relationship, the unit rate is y/x. Using $(8, 12)$, $12/8 = 1.5$.

3 A straight line through the origin represents $y = kx$. The constant is $7/3$, so the relationship is proportional.

4 A proportional relationship has no added or subtracted constant. $y = 4x$ has the form $y = kx$, so choice A is proportional.

5 The constant is $18/6 = 3$, so $y = 3x$. When $x = 10$, $y = 3(10) = 30$.

6 A proportional line must pass through the origin and have the form $y = kx$. The $+2$ shifts the line up, so it is linear but not proportional.

Week 6 Day 4 The Pythagorean Theorem

1 13	2 15	3 Yes	4 9.2 ft	5 No	6 13 cm

Explanations

1. Use $c^2 = 5^2 + 12^2 = 25 + 144 = 169$. Since $\sqrt{169} = 13$, the hypotenuse is 13.

2. Use $b^2 = 17^2 - 8^2 = 289 - 64 = 225$. Since $\sqrt{225} = 15$, the missing leg is 15.

3. The longest side is 25. Check $7^2 + 24^2 = 49 + 576 = 625$, and $25^2 = 625$, so the triangle is right.

4. The ladder is the hypotenuse, so $h^2 + 4^2 = 10^2$. Then $h^2 = 84$, and $\sqrt{84} \approx 9.2$ ft.

5. The longest side is 11. Since $6^2 + 8^2 = 36 + 64 = 100$ but $11^2 = 121$, the converse is not satisfied.

6. First find the base diagonal: $\sqrt{3^2 + 4^2} = 5$. Then use that with height 12: $\sqrt{5^2 + 12^2} = 13$ cm.

Answer review complete.

Use missed questions as a short reteach list.

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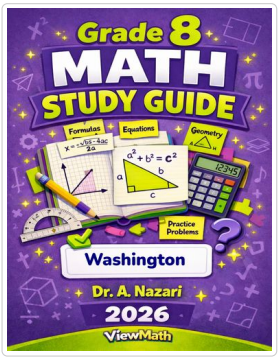

Study Guide

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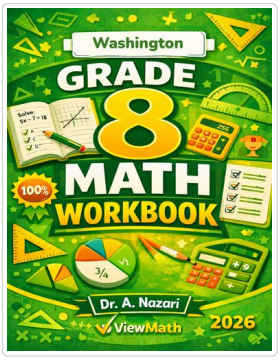

Workbook

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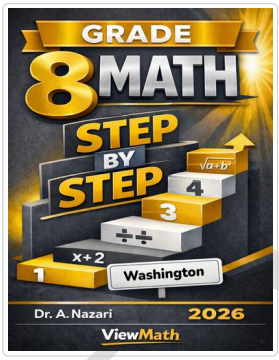

Step-by-Step

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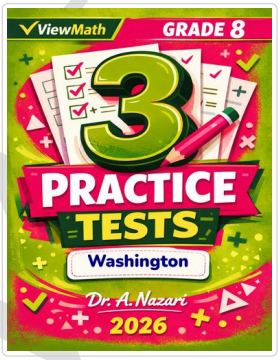

3 Practice Tests

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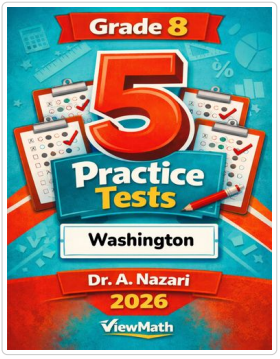

5 Practice Tests

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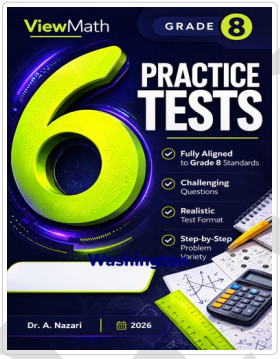

6 Practice Tests

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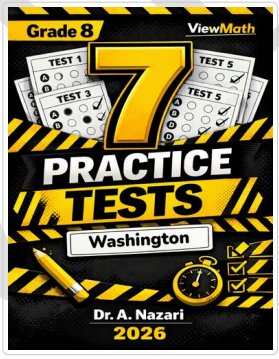

7 Practice Tests

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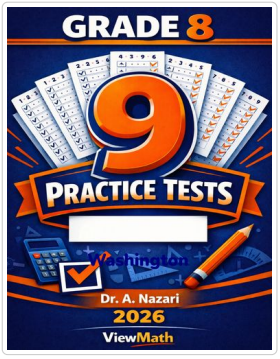

9 Practice Tests

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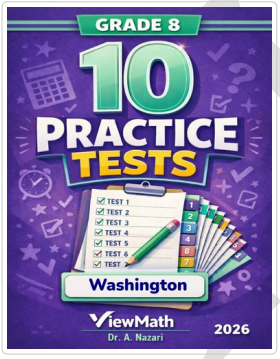

10 Practice Tests

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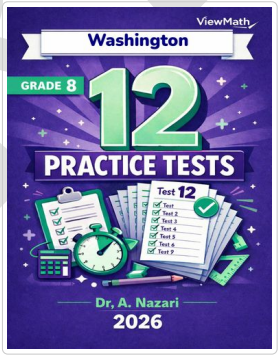

12 Practice Tests

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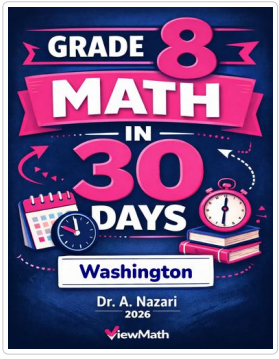

Math in 30 Days

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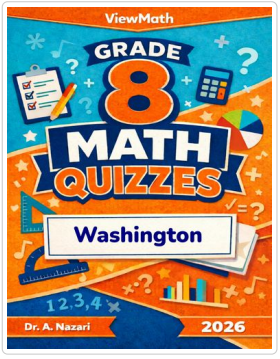

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