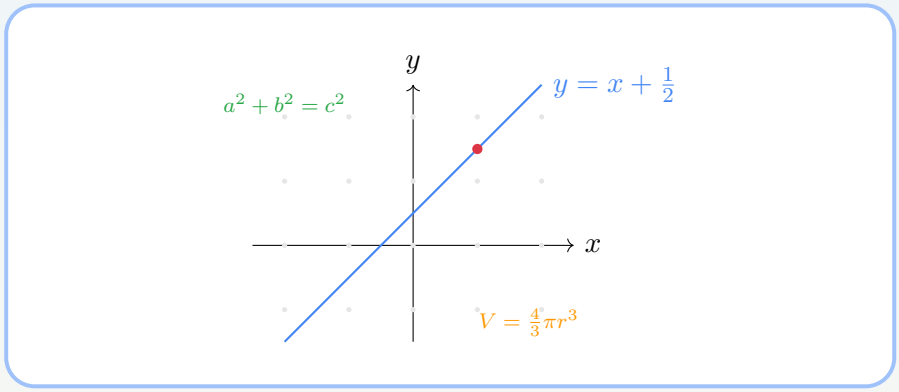
Arkansas ATLAS

8th Grade Math Workbook

Comprehensive Practice, Challenging Exercises, and Strategic Guidance for Complete Test-Day Confidence



Reza Nazari

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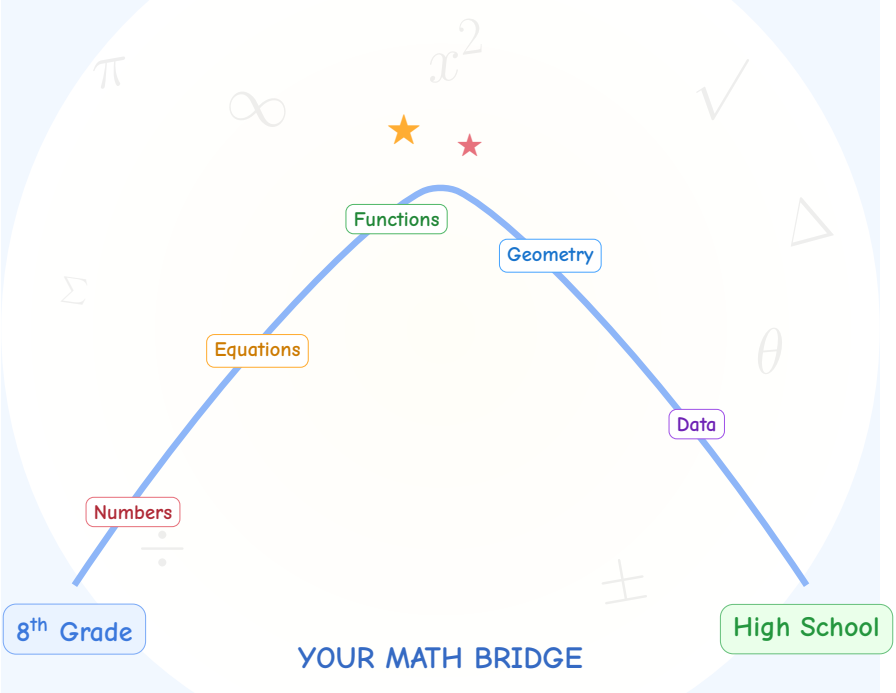
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Welcome, 8th Grader!

The Bridge Between Middle School and High School Starts Here



Dear Eighth Grader,

Welcome! This is *your* year. Everything you have built so far — working with fractions, decimals, ratios, and basic geometry — has been preparing you for this moment. Eighth-grade math is where all of those skills come together and open the door to high school and beyond.

8.GM.11	Given two similar two-dimensional figures, describe a sequence of transformations that exhibits similarity, including rotations, reflections, translations, and dilations

8.NCC | Arkansas

Grade 8 expectations grouped under 8.NCC.

8.NCC.1	Describe relationships in the real number system (rational and irrational)
8.NCC.2	Compare the size of irrational numbers and locate them on a number line by finding the rational approximations
8.NCC.3	Know and apply the properties of integer exponents to generate equivalent numerical expressions
8.NCC.4	Write very large and very small numbers in scientific notation using positive and negative exponents
8.NCC.5	Compare numbers written in scientific notation to determine how many times larger or smaller one number is than the other, using real-world and mathematical problems
8.NCC.6	Solve real-world and mathematical problems by performing operations with numbers written in standard and scientific notation
8.NCC.7	Solve equations in the form $x^2 = p$ or $x^3 = p$ where p is a positive rational number
8.NCC.8	Evaluate square roots of perfect squares and cube roots of perfect cubes

8.SP | Arkansas

Grade 8 expectations grouped under 8.SP.

8.SP.1	Construct scatter plots using bivariate data; determine if the data displays a linear or nonlinear pattern and positive, negative, or no association
8.SP.2	Construct straight lines to approximately fit data displaying a linear association when presented in scatter plots
8.SP.3	Construct and interpret a relative frequency table, using data from two categorical variables collected from the same subject

8.SP.4	Determine the sample space and use the sample space to determine the theoretical probability of a given set of outcomes for compound experiments, using organized lists, tables, or tree diagrams
8.SP.5	Determine theoretical and experimental probabilities of compound experiments
8.SP.6	Use theoretical probability of an event in a compound experiment to predict the number of times that event will occur for a large number of experiments

Table of Contents

★ 1 Real Numbers & Number Sense 14

★ 2 Exponents, Roots, & Scientific Notation 24

★ 3 Proportional Relationships & Slope 34

★ 4 Equations & Systems 42

★ 5 Functions: Foundations 52

★ 6 Functions: Models And Patterns 59

★ 7 Transformations & Similarity 67

★ 8 Angles & The Pythagorean Theorem 76

★ 9 Surface Area, Volume & 3D Figures 83

★ 10 Statistics and Probability 96

★ Test Overview 111

★ Test-Taking Strategies 114

★ Practice Test 1 117

★ Practice Test 2 136

★ Practice Test Answer Keys 156

★ Practice Test Answers and Explanations 158

★ Chapters Answers and Explanations 162

15. A walking trail runs along two straight segments. The first segment is $\sqrt{20}$ km and the second is π km. (a) Estimate $\sqrt{20}$ to the nearest tenth. (b) Using $\pi \approx 3.14$, estimate the total trail length. (c) If a hiker walks at 5 km/h, about how many minutes will the entire trail take? _____

16. A rectangular picture frame has dimensions $\sqrt{18}$ inches by $(2+\sqrt{5})$ inches. (a) Estimate each dimension to the nearest tenth. (b) Estimate the perimeter of the frame. (c) If framing material costs \$1.50 per inch, estimate the total cost. _____

17. The area of a circular garden is 50 m^2. (a) Using $A = \pi r^2$, solve for r in exact form. (b) Estimate r to the nearest tenth. (c) Estimate the circumference $C = 2\pi r$ to the nearest tenth of a metre. _____

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★ Chapter 1 Answer Key ★

Real Numbers & Number Sense

Topic 1 • Rational and Irrational Numbers

1) 3
2) 7
3) -12
4) Rational
5) Irrational
6) Irrational
7) Rational
8) Irrational
9) Rational
10) Irrational
11) Irrational
12) 13
13) Irrational
14) Yes
15) Irrational
16) No
17) Rational; 8 ft
18) 4 rational
19) False

Topic 2 • Turning Repeating Decimals into Fractions

1) $\frac{5}{9}$
2) $\frac{2}{9}$
3) $\frac{8}{9}$
4) 1
5) $\frac{1}{9}$
6) $\frac{2}{3}$
7) $\frac{5}{11}$
8) $\frac{3}{11}$
9) $\frac{2}{11}$
10) $\frac{7}{11}$
11) $\frac{1}{11}$
12) $\frac{6}{11}$
13) $\frac{1}{7}$
14) $\frac{1}{6}$
15) 36 pieces
16) Yes—the repeating decimal *is* the fraction $\frac{8}{11}$
17) $0.\overline{6} = \frac{2}{3}$; total $= \frac{2}{3} \times 5 = \frac{10}{3} = 3\frac{1}{3}$ cups
18) Both fractions are equal, but Eddie's is fully simplified: $\frac{5}{11}$
19) $\frac{1}{3} + \frac{2}{3} + \frac{5}{9} = \frac{14}{9} = 1\frac{5}{9}$ minutes

Topic 3 • Estimating Irrational Numbers

1) 3 and 4
2) 4 and 5
3) 5 and 6
4) 7 and 8
5) 8 and 9
6) 9 and 10
7) ≈ 2.4
8) ≈ 3.7
9) ≈ 5.5
10) ≈ 7.2
11) $\sqrt{3}$, 2, $\sqrt{5}$
12) $\sqrt{11}$
13) $8 < \sqrt{75} < 9$; closer to 9 since $\sqrt{75} \approx 8.66$
14) Drone A; $\sqrt{60} \approx 7.75 > 7.5$
15) Side ≈ 9.5 ft; fencing $\approx 4(9.5)(\$12) = \$456$
16) $\sqrt{113} \approx 10.6$ cm; need an 11 cm strip
17) 7.07 is more accurate; $7.07^2 = 49.9849 \approx 50$

Topic 4 • Estimating Expressions with Irrational Numbers

1) ≈ 6.28
2) ≈ 4.14
3) ≈ 5.64
4) ≈ 3.73
5) ≈ 4.42
6) 2
7) ≈ 6.21
8) ≈ 5.86
9) ≈ 1.86
10) ≈ 3.81
11) 5
12) ≈ 2.44
13) $\approx 9.4\ \text{m}^2$
14) Rope A; ≈ 0.55 m longer
15) Total $\approx 4.5 + 3.14 = 7.64$ km; time $\approx 7.64 \div 5 \times 60 \approx 92$ min
16) Perimeter $\approx 2(4.24 + 4.24) \approx 16.96$ in; cost $\approx \$25.44$
17) $r \approx 4.0$ m; $C \approx 25.1$ m

Answers and Explanations on page: 162

Full worked solutions for Chapter 1 are waiting there.

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