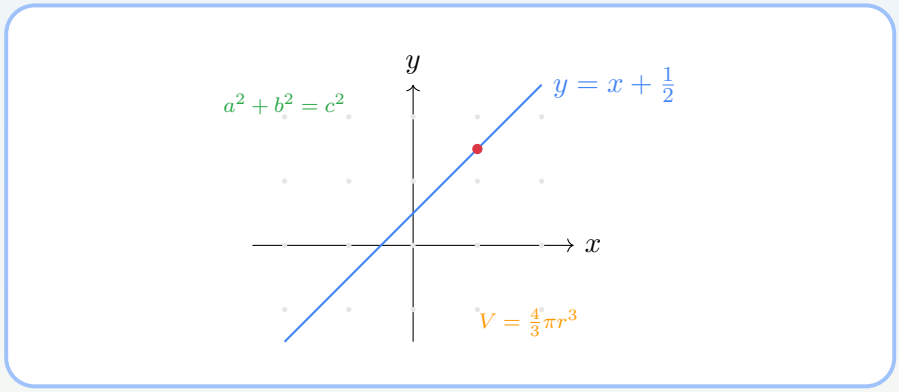
Florida FAST
8th Grade Math Workbook

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



Reza Nazari

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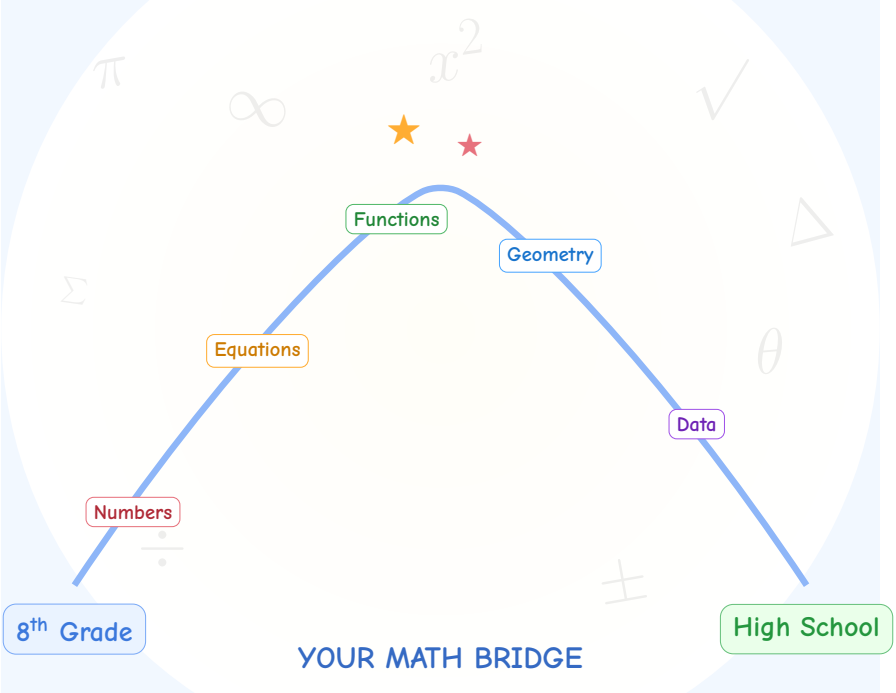
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Welcome, 8th Grader!

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.

MA.8.DP.2.3 Solve real-world problems involving probabilities related to single or repeated experiments, including making predictions based on theoretical probability

MA.8.F | Florida

Grade 8 expectations grouped under MA.8.F.

MA.8.F.1 Define, evaluate and compare functions

MA.8.F.1.1 Given a set of ordered pairs, a table, a graph or mapping diagram, determine whether the relationship is a function. Identify the domain and range of the relation

MA.8.F.1.2 Given a function defined by a graph or an equation, determine whether the function is a linear function. Given an input-output table, determine whether it could represent a linear function

MA.8.F.1.3 Analyze a real-world written description or graphical representation of a functional relationship between two quantities and identify where the function is increasing, decreasing or constant

MA.8.GR | Florida

Grade 8 expectations grouped under MA.8.GR.

MA.8.GR.1 Develop an understanding of the Pythagorean Theorem and angle relationships involving triangles

MA.8.GR.1.1 Apply the Pythagorean Theorem to solve mathematical and real-world problems involving unknown side lengths in right triangles

MA.8.GR.1.2 Apply the Pythagorean Theorem to solve mathematical and real-world problems involving the distance between two points in a coordinate plane

MA.8.GR.1.3 Use the Triangle Inequality Theorem to determine if a triangle can be formed from a given set of sides. Use the converse of the Pythagorean Theorem to determine if a right triangle can be formed from a given set of sides

MA.8.GR.1.4 Solve mathematical problems involving the relationships between supplementary, complementary, vertical or adjacent angles

MA.8.GR.1.5 Solve problems involving the relationships of interior and exterior angles of a triangle

MA.8.GR.1.6	Develop and use formulas for the sums of the interior angles of regular polygons by decomposing them into triangles
MA.8.GR.2	Understand similarity and congruence using models and transformations
MA.8.GR.2.1	Given a preimage and image generated by a single transformation, identify the transformation that describes the relationship
MA.8.GR.2.2	Given a preimage and image generated by a single dilation, identify the scale factor that describes the relationship
MA.8.GR.2.3	Describe and apply the effect of a single transformation on two-dimensional figures using coordinates and the coordinate plane
MA.8.GR.2.4	Solve mathematical and real-world problems involving proportional relationships between similar triangles

MA.8.NSO | Florida

Grade 8 expectations grouped under MA.8.NSO.

MA.8.NSO.1	Solve problems involving rational numbers, including numbers in scientific notation, and extend the understanding of rational numbers to irrational numbers
MA.8.NSO.1.1	Extend previous understanding of rational numbers to define irrational numbers within the real number system. Locate an approximate value of a numerical expression involving irrational numbers on a number line
MA.8.NSO.1.2	Plot, order and compare rational and irrational numbers, represented in various forms
MA.8.NSO.1.3	Extend previous understanding of the Laws of Exponents to include integer exponents. Apply the Laws of Exponents to evaluate numerical expressions and generate equivalent numerical expressions, limited to integer exponents and rational number bases, with procedural fluency
MA.8.NSO.1.4	Express numbers in scientific notation to represent and approximate very large or very small quantities. Determine how many times larger or smaller one number is compared to a second number
MA.8.NSO.1.5	Add, subtract, multiply and divide numbers expressed in scientific notation with procedural fluency
MA.8.NSO.1.6	Solve real-world problems involving operations with numbers expressed in scientific notation

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MA.8.NSO.1.7 Solve multi-step mathematical and real-world problems involving the order of operations with rational numbers including exponents and radicals

1.4 Estimating Expressions with Irrational Numbers

MA.8.AR.1.3, MA.8.NSO.1, MA.8.NSO.1.2

Quick Review and Helpful Hints

Useful approximations: $\sqrt{2} \approx 1.41$, $\sqrt{3} \approx 1.73$, $\sqrt{5} \approx 2.24$, $\pi \approx 3.14$

Strategy: Substitute ⇒ Simplify ⇒ Round to the required number of decimal places.

Bounding: Computing both a *lower bound* (using smaller approximations) and an *upper bound* (using larger ones) confirms how accurate the estimate is.

Example: Estimate π^2 to two decimal places.

Use $\pi \approx 3.14$. Then $\pi^2 \approx 3.14 \times 3.14$. Compute: $3 \times 3.14 = 9.42$ and $0.14 \times 3.14 = 0.4396$, so $\pi^2 \approx 9.42 + 0.44 = 9.86$. (The actual value is $9.8696\ldots$, confirming our estimate is close.)

Answer: $\pi^2 \approx 9.86$

Practice Problems

Estimate each expression to one decimal place. Use $\sqrt{2} \approx 1.41$, $\sqrt{3} \approx 1.73$, $\sqrt{5} \approx 2.24$, $\pi \approx 3.14$.

1. $2\pi \approx$ _____
2. $\pi + 1 \approx$ _____
3. $4\sqrt{2} \approx$ _____
4. $\sqrt{3} + 2 \approx$ _____
5. $3\pi - 5 \approx$ _____
6. $(\sqrt{2})^2 =$ _____
7. $2\sqrt{5} + \sqrt{3} \approx$ _____
8. $\pi^2 - 4 \approx$ _____
9. $5\sqrt{2} - 3\sqrt{3} \approx$ _____
10. $\frac{\pi}{2} + \sqrt{5} \approx$ _____
11. $(\sqrt{3})^2 + (\sqrt{2})^2 =$ _____
12. $\sqrt{2} \cdot \sqrt{3} \approx$ _____

Word Problems

13. A circular fountain has a radius of exactly $\sqrt{3}$ metres. Estimate the area of the fountain to the nearest tenth of a square metre. Use $\pi \approx 3.14$ and $\sqrt{3} \approx 1.732$. _____

14. Rope A has length $\pi + \sqrt{2}$ metres and Rope B has length 4 metres. Which rope is longer, and by approximately how much? Use $\pi \approx 3.14$ and $\sqrt{2} \approx 1.41$. _____

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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 $50\ \text{m}^2$. (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. _____

★ 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; $7.07^2 = 49.9849 \approx 50$

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