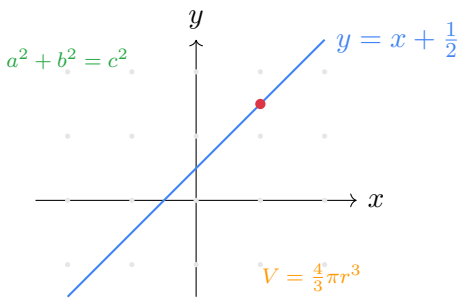
# Oklahoma OSTP

## 8th Grade Math Workbook

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




**Reza Nazari**

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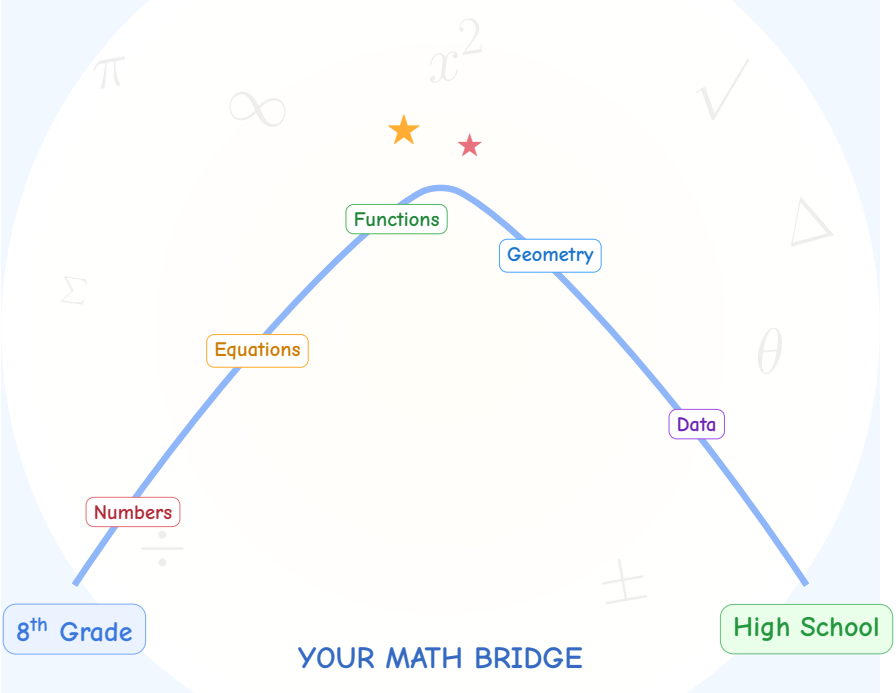
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# Welcome, 8th Grader!

## 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.

| | |
|---|---|
| PA.D.1.3 | Collect, display, and interpret data using scatter plots. Use the shape of the scatter plot to find the informal line of best fit, make statements about the average rate of change, and make predictions about values not in the original data set. Use appropriate titles, labels, and units |
| PA.D.2 | Calculate experimental probabilities and reason about probabilities to model and solve problems |
| PA.D.2.1 | Calculate experimental probabilities and represent them as percents, fractions, and decimals between 0 and 1. Use experimental probabilities to predict relative frequencies when actual probabilities are unknown |
| PA.D.2.2 | Determine how samples are chosen (randomness) to draw and support conclusions about generalizing a sample to a population, including identifying limitations and biases |
| PA.D.2.3 | Define, compare, and contrast the probabilities of dependent and independent events |

## PA.GM | Oklahoma

*Grade 8 expectations grouped under PA.GM.*

| | |
|---|---|
| PA.GM.1 | Apply the Pythagorean theorem to solve problems involving triangles |
| PA.GM.1.1 | Justify the Pythagorean theorem using measurements, diagrams, or dynamic software to solve problems in two dimensions involving right triangles |
| PA.GM.1.2 | Use the Pythagorean theorem to find the distance between any two points in a coordinate plane |
| PA.GM.2 | Justify and use formulas to calculate surface area and volume of three-dimensional figures |
| PA.GM.2.1 | Calculate the surface area of a rectangular prism using decomposition or nets. Use appropriate units (e.g., cm2) |
| PA.GM.2.2 | Calculate the surface area of a cylinder, in terms of pi ($\pi$) and using approximations for pi ($\pi$), using decomposition or nets. Use appropriate units (e.g., cm2) |
| PA.GM.2.3 | Justify why base area (B) and height (h) in the formula V = Bh are multiplied to find the volume of a rectangular prism. Use appropriate units (e.g., cm3) |

PA.GM.2.4 Develop and use the formulas V=(πr)2h and V = Bh to determine the volume of right cylinders, in terms of π and using approximations for pi (π). Justify why base area (B) and height (h) are multiplied to find the volume of a right cylinder. Use appropriate units (e.g., cm3)

## PA.N | Oklahoma

*Grade 8 expectations grouped under PA.N.*

PA.N.1 Read, write, compare, classify, and represent real numbers, and use them to solve problems in various contexts

PA.N.1.1 Develop and apply the properties of integer exponents, including a0= 1 (with a ≠ 0), to generate equivalent numerical and algebraic expressions

PA.N.1.2 Express and compare approximations of very large and very small numbers using scientific notation

PA.N.1.3 Multiply and divide numbers expressed in scientific notation and express the answer in scientific notation

PA.N.1.4 Compare and order real numbers; locate real numbers on a number line. Identify the square roots of perfect squares to 400 or, if it is not a perfect square root, locate it as an irrational number between two consecutive positive integers



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**15.** A walking trail runs along two straight segments. The first segment is $\sqrt{20}$ km and the second is $\pi$ 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) $\approx 2.4$
8) $\approx 3.7$
9) $\approx 5.5$
10) $\approx 7.2$
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 $\approx 9.5$ 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) $\approx 6.28$
2) $\approx 4.14$
3) $\approx 5.64$
4) $\approx 3.73$
5) $\approx 4.42$
6) 2
7) $\approx 6.21$
8) $\approx 5.86$
9) $\approx 1.86$
10) $\approx 3.81$
11) 5
12) $\approx 2.44$
13) $\approx 9.4\ \text{m}^2$
14) Rope A; $\approx 0.55$ 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: 158
Full worked solutions for Chapter 1 are waiting there.



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