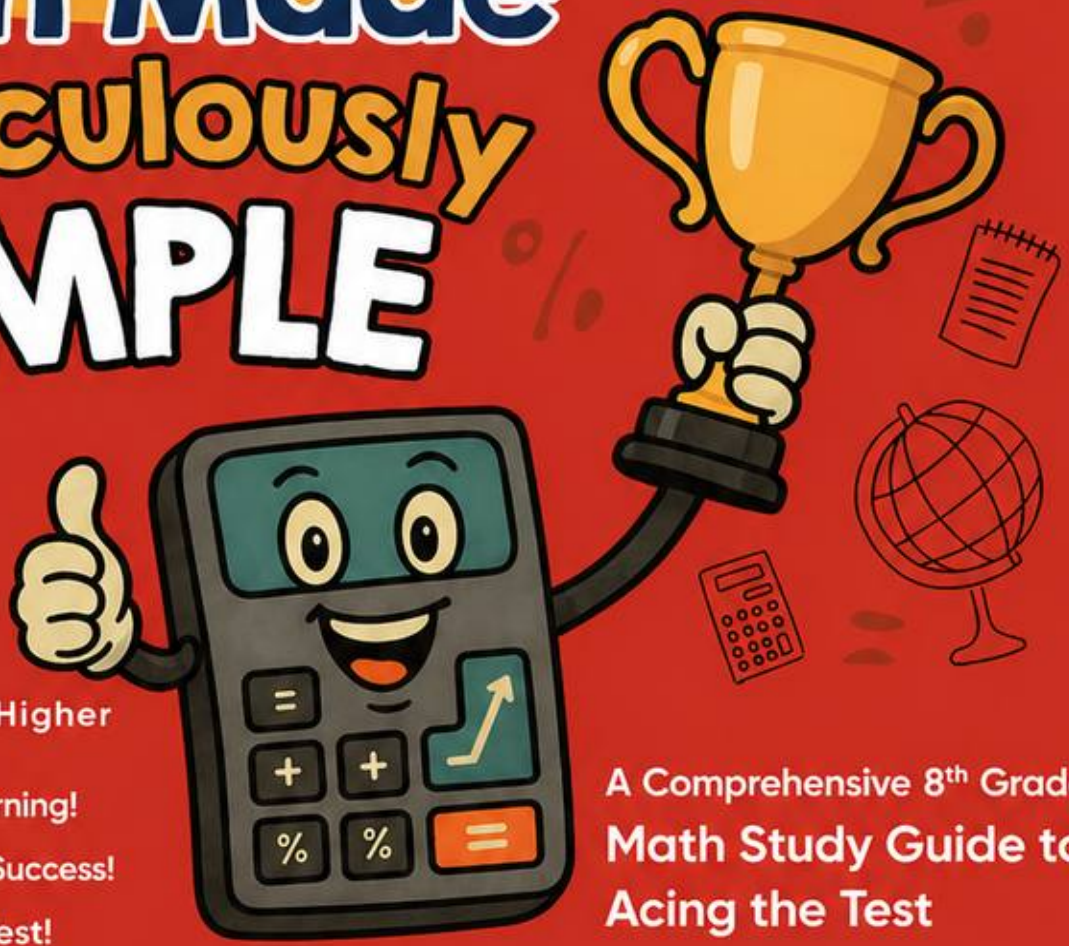
Texas STAAR Grade 8

Math Made Ridiculously SIMPLE



- Smarter Practice. Higher Scores.
- Fast, Fun, Focused Learning!
- Your Shortcut to Math Success!
- Conquer the Math Test!

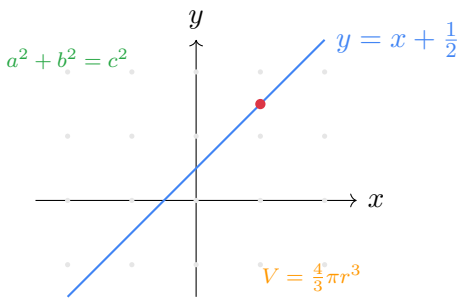
A Comprehensive 8th Grade Math Study Guide to Acing the Test

Learn Faster · Understand Deeper · Succeed with Confidence

Texas STAAR Grade 8 Math

Made Ridiculously Simple

A Comprehensive 8th Grade Math Study Guide to Acing the STAAR Test



Reza Nazari

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8.4(A)	use similar right triangles to develop an understanding that slope, m, given as the rate comparing the change in y-values to the change in x-values, (y2- y1)/ (x2- x1), is the same for any two points (x1, y1) and (x2, y2) on the same line
8.4(B)	graph proportional relationships, interpreting the unit rate as the slope of the line that models the relationship;
8.4(C)	use data from a table or graph to determine the rate of change or slope and y-intercept in mathematical and real-world problems

8.5 | The student applies mathematical process standards to use proportional and. . .

The student applies mathematical process standards to use proportional and non-proportional relationships to develop foundational concepts of functions

8.5(A)	represent linear proportional situations with tables, graphs, and equations in the form of $y = kx$
8.5(B)	represent linear non-proportional situations with tables, graphs, and equations in the form of $y = mx + b$, where $b \neq 0$
8.5(C)	contrast bivariate sets of data that suggest a linear relationship with bivariate sets of data that do not suggest a linear relationship from a graphical representation
8.5(D)	use a trend line that approximates the linear relationship between bivariate sets of data to make predictions
8.5(E)	solve problems involving direct variation
8.5(F)	distinguish between proportional and non-proportional situations using tables, graphs, and equations in the form $y = kx$ or $y = mx + b$, where $b \neq 0$
8.5(G)	identify functions using sets of ordered pairs, tables, mappings, and graphs
8.5(H)	identify examples of proportional and non-proportional functions that arise from mathematical and real-world problems;
8.5(I)	write an equation in the form $y = mx + b$ to model a linear relationship between two quantities using verbal, numerical, tabular, and graphical representations

8.6 | The student applies mathematical process standards to develop mathematical. . .

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The student applies mathematical process standards to develop mathematical relationships and make connections to geometric formulas

8.6(A)	describe the volume formula V = Bh of a cylinder in terms of its base area and its height
8.6(B)	model the relationship between the volume of a cylinder and a cone having both congruent bases and heights and connect that relationship to the formulas;
8.6(C)	use models and diagrams to explain the Pythagorean theorem

8.7 | The student applies mathematical process standards to use geometry to solve problems

The student applies mathematical process standards to use geometry to solve problems

8.7(A)	solve problems involving the volume of cylinders, cones, and spheres
8.7(B)	use previous knowledge of surface area to make connections to the formulas for lateral and total surface area and determine solutions for problems involving rectangular prisms, triangular prisms, and cylinders
8.7(C)	use the Pythagorean Theorem and its converse to solve problems;
8.7(D)	determine the distance between two points on a coordinate plane using the Pythagorean Theorem

8.8 | The student applies mathematical process standards to use one-variable equations or...

The student applies mathematical process standards to use one-variable equations or inequalities in problem situations

8.8(A)	write one-variable equations or inequalities with variables on both sides that represent problems using rational number coefficients and constants

8.8(B)	write a corresponding real-world problem when given a one-variable equation or inequality with variables on both sides of the equal sign using rational number coefficients and constants
8.8(C)	model and solve one-variable equations with variables on both sides of the equal sign that represent mathematical and real-world problems using rational number coefficients and constants;
8.8(D)	use informal arguments to establish facts about the angle sum and exterior angle of triangles, the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles
8.9	The student applies mathematical process standards to use multiple representations to develop foundational concepts of simultaneous linear equations

8.10 | Two-dimensional shapes

Analyze properties and attributes of two-dimensional figures

8.10(A)	generalize the properties of orientation and congruence of rotations, reflections, translations, and dilations of two-dimensional shapes on a coordinate plane
8.10(B)	differentiate between transformations that preserve congruence and those that do not
8.10(C)	explain the effect of translations, reflections over the x- or y-axis, and rotations limited to 90°, 180°, 270°, and 360° as applied to two-dimensional shapes on a coordinate plane using an algebraic representation;
8.10(D)	model the effect on linear and area measurements of dilated two-dimensional shapes

8.11 | Measurement and data

Use measurement and data analysis to solve real-world problems

8.11(A)	construct a scatterplot and describe the observed data to address questions of association such as linear, non-linear, and no association between bivariate data
8.11(B)	determine the mean absolute deviation and use this quantity as a measure of the average distance data are from the mean using a data set of no more than 10 data points;

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Examples

① Write $0.\overline{7}$ as a fraction.

Set $x = 0.7777\ldots$ (let the decimal be your variable). Since one digit repeats, multiply both sides by 10: $10x = 7.7777\ldots$ Now here's the magic—subtract the original from this new equation: $10x - x = 7.7777\ldots - 0.7777\ldots$. The repeating parts cancel! This gives $9x = 7$, so $x = \frac{7}{9}$. See how the repeating tail disappeared?

Answer: $\frac{7}{9}$

② Write $0.\overline{36}$ as a fraction in lowest terms.

Let $x = 0.363636\ldots$ and notice that "36" is the repeating block—that's two digits. So multiply by 100: $100x = 36.363636\ldots$ **Subtract the original:** $100x - x = 36.363636\ldots - 0.363636\ldots$, which gives $99x = 36$. **Solve:** $x = \frac{36}{99}$. But wait—we're not done! Simplify by dividing top and bottom by their GCF, which is 9: $\frac{36}{99} = \frac{4}{11}$. Always check your work and reduce to lowest terms!

Answer: $\frac{4}{11}$

Practice Problems

Convert each repeating decimal to a fraction in lowest terms.

1. $0.\overline{5} =$ _____

2. $0.\overline{2} =$ _____

3. $0.\overline{8} =$ _____

4. $0.\overline{9} =$ _____

5. $0.\overline{1} =$ _____

6. $0.\overline{6} =$ _____

7. $0.\overline{45} =$ _____

8. $0.\overline{27} =$ _____

9. $0.\overline{18} =$ _____

10. $0.\overline{63} =$ _____

11. $0.\overline{09} =$ _____

12. $0.\overline{54} =$ _____

13. $0.\overline{142857} =$ _____

14. $0.1\overline{6} =$ _____

15. $0.\overline{3} =$ _____

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Study Tips

- ☞ **Here's a pattern:** the denominator always has as many 9s as there are digits in the repeating block. 1-digit repeating → 9 in denominator; 2-digit → 99; 3-digit → 999. Easy!
- ☞ **Mind-blower:** $0.\overline{9} = 1$ exactly (not an approximation!). Try it yourself with the subtraction method: $10x = 9.\overline{9}$, subtract to get $9x = 9$, so $x = 1$.
- ☞ For mixed decimals like $0.1\overline{6}$ (with a non-repeating part), shift the non-repeating part first by multiplying by 10: $10x = 1.\overline{6}$. Then convert to $1\frac{2}{3}$ and divide by 10 to undo the shift.

✍ Word Problems

16. A factory machine cuts wire into pieces whose length in metres is $0.\overline{3}$. If a full spool holds exactly 12 metres of wire, how many complete pieces can be cut from one spool?

_____

17. Keiko divides 8 by 11 on her calculator and sees $0.727272\ldots$ on the screen. Her classmate Omar says the exact value is $\frac{8}{11}$, not a repeating decimal. Are both descriptions correct? Explain.

_____

18. A recipe calls for $0.\overline{142857}$ cups of vanilla extract. (a) Convert $0.\overline{142857}$ to a fraction. (b) Simplify the fraction. (c) If the recipe is tripled, how many cups of extract are needed? Express as a fraction.

_____

19. Two students each earn money per hour as a repeating decimal. Student A earns $\$12.\overline{3}$ per hour and Student B earns \$12.75 per hour. (a) Convert $12.\overline{3}$ to a mixed number. (b) Who earns more per hour? (c) How much more does the higher earner make in a 6-hour shift?

_____

20. A scientist measures the density of a metal sample as $7.\overline{18}$ g/cm^3. (a) Convert $7.\overline{18}$ to a fraction. (b) A block of this metal is 10 cm^3. What is its mass as a fraction? (c) Round the mass to the nearest gram.

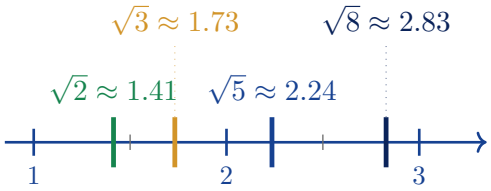
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1.3 Estimating Irrational Numbers

8.1(C), 8.1(G), 8.2(B)

When a square root isn't a perfect square, you can't just write down the exact decimal, but here's the good news: you can estimate it super well! The trick is to squeeze it between two perfect squares. For example, since $36 < 45 < 49$, you immediately know that $6 < \sqrt{45} < 7$—your answer is somewhere in that range. Then test tenths or hundredths to narrow it down even more. **The why behind this:** when you square nearby numbers, they tell you if you're too low or too high. This clever method helps you place irrational numbers on a number line and compare them to regular whole numbers and decimals. You've got a superpower now!



Key Concepts & Quick Review

Squeeze between consecutive integers: Find n and $n+1$ such that $n^2 < x < (n+1)^2$; then $n < \sqrt{x} < n+1$.

Refine to tenths: Try $n.1$, $n.2, \ldots$ until you find $a^2 < x < b^2$; then $a < \sqrt{x} < b$.

Comparing irrationals: $\sqrt{a} < \sqrt{b}$ whenever $a < b$ $(a, b > 0)$, so larger radicand $\Rightarrow$ larger square root.

Examples

① Between which two consecutive integers does $\sqrt{20}$ lie?

Find two perfect squares that squeeze 20: We have $4^2 = 16 < 20$ and $5^2 = 25 > 20$. So $\sqrt{20}$ must be between 4 and 5—you can be sure of that! **Now here's a helpful hint:** since 20 is closer to 25 than to 16, the square root is closer to 5. In fact, $\sqrt{20} \approx 4.47$—pretty close to 5, right?

Answer: $4 < \sqrt{20} < 5$