

Middle School Math Review Guide

A print-friendly grades 6-8 math guide covering number sense, fractions, integers, ratios, percents, expressions, equations, inequalities, coordinate planes, geometry, measurement, data, statistics, and probability. Use it before quizzes, homework review, or Algebra 1 readiness work.

SECTIONS	6	WORKED EXAMPLES	6	FORMAT	Print friendly
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How to use this guide

A formula you cannot place is not knowledge yet. Work the recall drill below before the questions.

- Start with the topic that is blocking current homework, then check the prerequisite row beside it.
- Write each setup before calculating. Ratios, equations, and word problems are easier when the structure is visible.
- Keep an error log. Mark whether the mistake came from arithmetic, setup, vocabulary, or rushing.

1. Number sense and operations

NAME	FORMULA	WHEN TO USE
Fraction addition	$a/b + c/d = (ad + bc)/bd$	Use a common denominator before adding.
Fraction multiplication	$(a/b) \times (c/d) = ac/bd$	Multiply numerators and denominators, then simplify.
Decimal to percent	$\text{decimal} \times 100\%$	Move from decimal form to a percent.
Integer addition	same signs add; different signs subtract	Track direction on a number line.
Order of operations	PEMDAS	Simplify expressions in a consistent order.

WORKED EXAMPLE

Simplify $3/4 + 2/3$.

1. Common denominator = 12
2. $3/4 = 9/12$ and $2/3 = 8/12$
3. $9/12 + 8/12 = 17/12 = 1 \frac{5}{12}$

Check: The answer is greater than 1 because $3/4 + 2/3$ is more than two halves.

2. Ratios, rates, and percents

NAME	FORMULA	WHEN TO USE
Ratio	$a:b$ or a/b	Compare two quantities.
Unit rate	quantity per 1 unit	Find miles per hour, dollars per item, or pages per day.
Proportion	$a/b = c/d$	Solve equivalent ratio problems.
Percent of a number	$\text{percent} \times \text{whole}$	Use decimal form of the percent.

NAME	FORMULA	WHEN TO USE
Percent change	$(\text{change}/\text{original}) \times 100\%$	Find increase or decrease from an original value.

WORKED EXAMPLE

A pack of 6 notebooks costs \$9. Find the unit price.

- Unit price = total cost / number of notebooks
- $9 / 6 = 1.50$
- Each notebook costs \$1.50

Check: Six notebooks at \$1.50 each cost \$9 total.

3. Expressions and equations

NAME	FORMULA	WHEN TO USE
Like terms	same variable and exponent	Combine terms such as $4x$ and $7x$.
Distributive property	$a(b + c) = ab + ac$	Remove parentheses.
One-step equation	$x + a = b$	Undo the operation on both sides.
Two-step equation	$ax + b = c$	Undo addition/subtraction, then multiplication/division.
Check a solution	substitute the value	Make sure both sides match.

WORKED EXAMPLE

Solve $4x - 7 = 21$.

- Add 7 to both sides: $4x = 28$
- Divide by 4: $x = 7$
- Check: $4(7) - 7 = 21$

Check: The solution makes the original equation true.

4. Inequalities and coordinate plane

NAME	FORMULA	WHEN TO USE
Inequality symbols	$<, >, \leq, \geq$	Compare quantities or describe a range.
Flip the inequality	multiply or divide by a negative	Needed when solving inequalities.
Ordered pair	(x, y)	Move left/right first, then up/down.
Slope	$(y_2 - y_1)/(x_2 - x_1)$	Measure rate of change between points.
Linear pattern	$y = mx + b$	Connect a table, graph, and equation.

WORKED EXAMPLE

Find the slope between (1, 3) and (5, 11).

1. Change in $y = 11 - 3 = 8$
2. Change in $x = 5 - 1 = 4$
3. Slope = $8/4 = 2$

Check: For every 1 step right, y rises 2.

5. Geometry and measurement

NAME	FORMULA	WHEN TO USE
Triangle area	$(1/2) \times \text{base} \times \text{height}$	Use perpendicular height.
Rectangle area	$\text{length} \times \text{width}$	Find space inside a rectangle.
Circle area	$\pi \times r^2$	Find space inside a circle.
Rectangular prism volume	$\text{length} \times \text{width} \times \text{height}$	Find cubic units in a box.
Unit conversion	multiply by a conversion factor	Change feet to inches, minutes to hours, or similar units.

WORKED EXAMPLE

Find the volume of a box that is 8 cm long, 5 cm wide, and 3 cm tall.

1. $V = \text{length} \times \text{width} \times \text{height}$
2. $V = 8 \times 5 \times 3$
3. $V = 120$ cubic cm

Check: Volume uses cubic units.

6. Data, statistics, and probability

NAME	FORMULA	WHEN TO USE
Mean	sum of values / number of values	Find the average.
Median	middle value	Order the data first.
Mode	most frequent value	There may be none or more than one.
Range	maximum - minimum	Describe spread.
Probability	favorable outcomes / total outcomes	Use when outcomes are equally likely.

WORKED EXAMPLE**Find the mean of 6, 8, 8, 10, and 13.**

1. $\text{Sum} = 6 + 8 + 8 + 10 + 13 = 45$
2. There are 5 values
3. $\text{Mean} = 45/5 = 9$

Check: The mean should be between the smallest and largest value.

Notes and tutor hand-off

Bring this page to your next session so the tutor can start from what actually blocked you.

Topic I need to review before the next quiz:

One setup step I skipped or rushed:

Worksheet question numbers to review with a tutor:
