

7th Grade Math Final Exam Review

Everything on a typical 7th grade math final, one unit at a time: the rules you need, the mistakes that cost the most points, and three practice questions per unit with answers. Start with the quick checks to find your weak units, then use the linked lessons to fix them.

Free from StudyQuest Academy · Updated October 6, 2026 · studyquest.academy/finals/7th-grade-math

What's on the 7th Grade Math final

Most schools teach proportional relationships, percents and operations with negative numbers and fractions in the first semester, then equations, inequalities, geometry, probability and statistics in the second. The order changes from textbook to textbook: some start with integers, others with scale drawings, and expressions and equations can land on either side of winter break. If your final is in December, focus on the Semester 1 units and check your review sheet for the rest.

Unit	Usually on	Lessons
1. Ratios & proportional relationships	Semester 1	Ratios & Proportional Relationships
2. Percents, tax, tips & simple interest	Semester 1	Ratios & Proportional Relationships, Simple & Compound Interest
3. Operations with rational numbers	Semester 1	The Number System
4. Expressions	Semester 1	Expressions & Equations
5. Equations & inequalities	Semester 2	Expressions & Equations
6. Scale drawings & angle relationships	Semester 2	Geometry, Ratios & Proportional Relationships
7. Circles, area, surface area & volume	Semester 2	Geometry
8. Probability	Semester 2	Probability & Counting, Statistics & Probability

Unit	Usually on	Lessons
9. Statistics & sampling	Semester 2	Statistics & Probability

A two-week study plan

DAY 14

Find your weak units

Do the quick checks for all 9 units without notes. Mark each unit solid, shaky or lost. This tells you where your study time goes.

DAYS 13–6

Fix the lost and shaky units, one a day

Start with the units you marked lost, then shaky. For each one, read the must-know list, work through the linked lesson, and redo that unit's quick checks until you get all three right.

DAYS 5–3

Mixed practice

Finals mix units together, so practice that way: pick problems from different units, work them without looking at which unit they came from, and check each answer.

DAY 2

Formulas and mistakes

Review the formula sheet and every "common mistakes" list. Write out from memory the formulas you still look up.

DAY 1

Light review and sleep

Redo only the questions you missed before. Then stop: a full night of sleep helps your memory more than a late cram session.

UNIT 1 • SEMESTER 1

Ratios & proportional relationships

MUST KNOW

- A unit rate is the amount for one unit of the second quantity. Divide to find it, even with fractions: $\frac{1}{2}$ mile in $\frac{1}{4}$ hour is $\frac{1}{2} \div \frac{1}{4} = 2$ miles per hour.
- Two quantities are proportional when $\frac{y}{x}$ is the same for every pair in the table. That shared value is the constant of proportionality k .
- A proportional relationship can be written $y = kx$, where k is the unit rate.
- The graph of a proportional relationship is a straight line through the origin $(0, 0)$, and the point $(1, k)$ shows the unit rate.
- Solve a proportion by scaling or by cross-multiplying: if $\frac{a}{b} = \frac{c}{d}$, then $ad = bc$.

COMMON MISTAKES

- Calling every straight line proportional. $y = 2x + 3$ is a line, but it does not pass through the origin, so it is not proportional.
- Mixing up the order in a proportion. Keep the same quantity on top in both ratios, such as miles over gallons on both sides.

QUICK CHECK

1.1 A recipe uses $\frac{3}{4}$ cup of sugar for every $\frac{1}{2}$ cup of butter. How many cups of sugar is that per cup of butter?

1.2 A table has the pairs $(2, 7)$, $(5, 17.5)$ and $(8, 28)$. Is the relationship proportional? If so, write the equation.

1.3 A car goes 150 miles on 6 gallons of gas. At the same rate, how far does it go on 10 gallons?

UNIT 2 · SEMESTER 1

Percents, tax, tips & simple interest

MUST KNOW

- Write the percent as a decimal before you multiply: $r\%$ of Q is $\frac{r}{100} \cdot Q$, so 15% of 60 is $0.15 \cdot 60 = 9$.
- Tax, tips and markups add to the price, so multiply the original by $(1 + r)$. Discounts subtract, so multiply by $(1 - r)$: 20% off means paying 0.8 of the price.
- Percent change = $\frac{\text{new} - \text{original}}{\text{original}} \cdot 100\%$. A positive result is an increase; a negative result is a decrease.
- Simple interest is $I = Prt$: principal times the yearly rate (as a decimal) times the time in years.
- Percent error = $\frac{|\text{estimate} - \text{actual}|}{\text{actual}} \cdot 100\%$.

COMMON MISTAKES

- Dividing by the new amount in a percent change problem. Always divide by the original amount.
- Using the wrong rate or time in $I = Prt$. 4% is 0.04, not 4, and 6 months is 0.5 years.
- Adding back-to-back discounts. 20% off and then another 10% off is 28% off in all, not 30%, because the second discount is taken from the lower price.

QUICK CHECK

2.1 A meal costs 40 dollars. You leave an 18% tip. What is the total?

2.2 A jacket drops from 80 dollars to 60 dollars. What is the percent decrease?

2.3 You deposit 500 dollars at 3% simple interest for 4 years. How much interest do you earn?

Operations with rational numbers

MUST KNOW

- Adding signed numbers: same signs, add and keep the sign; different signs, subtract and keep the sign of the number farther from zero.
- Subtracting is adding the opposite: $a - b = a + (-b)$, so $5 - (-3) = 5 + 3 = 8$.
- Multiplying or dividing: same signs give a positive, different signs give a negative. Dividing by zero is undefined.
- A fraction becomes a decimal by long division, and the decimal either ends or repeats: $\frac{3}{8} = 0.375$ and $\frac{2}{3} = 0.\overline{6}$.
- The distance between two numbers a and b on a number line is $|a - b|$.

COMMON MISTAKES

- Writing $-8 - 5 = -3$. Subtracting 5 moves 5 more to the left, so $-8 - 5 = -13$.
- Losing track of signs in a long product. Count the negative factors: an even number of them gives a positive, an odd number gives a negative, so $(-2)(-3)(-4) = -24$.

QUICK CHECK

3.1 Simplify $-7 - (-12) + (-3)$.

3.2 Simplify $-\frac{3}{4} \div \frac{3}{8}$.

3.3 The temperature was -6 degrees Fahrenheit at dawn and 9 degrees at noon. How many degrees did it rise?

UNIT 4 · SEMESTER 1

Expressions

MUST KNOW

- Like terms have the same variable part. Combine them by adding the coefficients: $4x - 7x = -3x$.
- Distribute to every term inside the parentheses, signs included: $-3(2x - 5) = -6x + 15$.
- Factor by pulling out the greatest common factor: $12x + 18 = 6(2x + 3)$.
- To subtract an expression, subtract every term: $(5x + 2) - (3x - 4) = 5x + 2 - 3x + 4 = 2x + 6$.
- Rewriting can show meaning: a price p plus 6% tax is $p + 0.06p$, which is the same as $1.06p$.

COMMON MISTAKES

- Combining unlike terms. $3x + 4$ cannot be simplified to $7x$.
- Subtracting only the first term of an expression in parentheses. The minus sign applies to every term inside.

QUICK CHECK

4.1 Simplify $2(3x - 4) - 5x + 10$.

4.2 Factor $15y - 20$.

4.3 An item costs p dollars and is 25% off. Write two equivalent expressions for the sale price.

UNIT 5 · SEMESTER 2

Equations & inequalities

MUST KNOW

- For a two-step equation like $px + q = r$, undo the addition or subtraction first, then undo the multiplication or division.
- For $p(x + q) = r$, either divide both sides by p first or distribute first; both give the same answer.
- Solve an inequality the same way, but flip the inequality sign when you multiply or divide both sides by a negative number.
- Graph inequality solutions on a number line: open circle for $<$ or $>$, closed circle for $\leq$ or $\geq$.
- In a word problem, define the variable, write the equation or inequality, solve it, and answer in a sentence with units. Check that the answer makes sense, such as a whole number of tickets.

COMMON MISTAKES

- Forgetting to flip the sign: $-2x < 10$ becomes $x > -5$, not $x < -5$.
- Dividing before subtracting in $3x + 5 = 20$. If you divide first, you must divide every term, so subtract 5 first.

QUICK CHECK

5.1 Solve $-4x + 9 = 25$.

5.2 Solve $3(x + 2) = 27$.

5.3 You have 50 dollars. Fair admission is 8 dollars and each ride costs 3 dollars. Write an inequality for the number of rides r , and find the most rides you can take.

Scale drawings & angle relationships

MUST KNOW

- A scale like 1 inch : 12 miles means every inch on the drawing stands for 12 actual miles. Multiply drawing lengths by the scale to get actual lengths.
- If lengths are multiplied by a scale factor k , areas are multiplied by k^2 .
- Complementary angles add to 90° , supplementary angles add to 180° , and vertical angles (across from each other where two lines cross) are equal.
- The three angles of a triangle add to 180° .
- Three lengths make a triangle only when the two shorter lengths add to more than the longest one.

COMMON MISTAKES

- Scaling area by k instead of k^2 . Doubling every side of a square makes its area 4 times as large, not 2 times.
- Mixing up complementary and supplementary. Complementary angles make a right angle (90°); supplementary angles make a straight line (180°).

QUICK CHECK

6.1 On a map, 1 inch represents 12 miles. Two towns are 3.5 inches apart on the map. How far apart are they?

6.2 Two angles are supplementary. One measures 64° . What does the other measure?

6.3 Two vertical angles measure $(3x + 10)^\circ$ and $(5x - 20)^\circ$. Find x and the angle measure.

UNIT 7 · SEMESTER 2

Circles, area, surface area & volume

MUST KNOW

- Circumference is $C = \pi d = 2\pi r$ and area is $A = \pi r^2$. Use 3.14 or the π key, or leave the answer in terms of π if the question says so.
- Find the area of a composite figure by splitting it into rectangles, triangles and parts of circles, then adding (or subtracting) the pieces.
- The volume of a right prism is $V = Bh$, where B is the area of the base. For a rectangular prism that is $V = lwh$.
- Surface area is the total area of all the faces. For a rectangular prism, $SA = 2(lw + lh + wh)$.
- Slicing a right rectangular prism parallel to its base gives a cross-section the same shape and size as the base.

COMMON MISTAKES

- Putting the diameter into $A = \pi r^2$. Halve the diameter to get the radius first.
- Using the wrong units. Area is in square units, and volume is in cubic units.

QUICK CHECK

7.1 A circle has a diameter of 10 cm. Find its circumference and area in terms of π .

7.2 A triangular prism has a triangle base with base 6 cm and height 4 cm. The prism is 10 cm long. Find its volume.

7.3 Find the surface area of a rectangular prism that is 5 by 3 by 2 inches.

UNIT 8 · SEMESTER 2

Probability

MUST KNOW

- Probability is $\frac{\text{favorable outcomes}}{\text{total outcomes}}$, from 0 (impossible) to 1 (certain); $\frac{1}{2}$ means equally likely to happen or not.
- Experimental probability is $\frac{\text{times it happened}}{\text{total trials}}$. With more trials, it usually gets closer to the theoretical probability.
- List a sample space with an organized list, a table or a tree diagram, or count it by multiplying the number of choices at each stage.
- For independent events, the probability of both is the product: $P(\text{heads and a 6}) = \frac{1}{2} \cdot \frac{1}{6} = \frac{1}{12}$.
- The probability an event does not happen is $1 - P(\text{event})$.

COMMON MISTAKES

- Adding the probabilities when the question asks for one event and another. For independent events, multiply.
- Treating (1, 2) and (2, 1) as the same outcome when rolling two number cubes. They are different outcomes, which is why there are 36 in all.

QUICK CHECK

8.1 A bag holds 3 red, 5 blue and 2 green marbles. What is the probability of picking blue?

8.2 You roll two number cubes. What is the probability the sum is 7?

8.3 A spinner landed on red 18 times in 60 spins. What is the experimental probability of red, and about how many reds would you expect in 200 spins?

Statistics & sampling

MUST KNOW

- A sample is part of a population. A random sample gives everyone the same chance of being picked, so its results can be used to estimate the whole population.
- Convenience samples (your friends, one club, whoever answers) and voluntary responses are often biased.
- To make a prediction, apply the sample rate to the population: if 12 of 50 students sampled pick pizza, expect about 24% of the school to pick pizza.
- Different random samples from the same population give slightly different results; larger samples usually vary less.
- Compare two groups by their centers (mean or median) and their spreads (mean absolute deviation or interquartile range), and look at how much the data overlap.

COMMON MISTAKES

- Treating a convenience sample as representative. Asking only the soccer team about favorite sports will overcount soccer.
- Declaring one group "better" from the centers alone. If the spreads are large and the data overlap a lot, the difference may not mean much.

QUICK CHECK

9.1 To find the favorite sport at a school, a student surveys the basketball team. Is this a good sample? Explain.

9.2 In a random sample of 80 students, 28 walk to school. The school has 600 students. About how many walk?

9.3 Class A has a mean score of 82 and Class B has a mean of 74. Both have a mean absolute deviation of 4. How many MADs apart are the means?

Answer key

Unit 1: Ratios & proportional relationships

1.1 $1\frac{1}{2}$ cups. $\frac{3}{4} \div \frac{1}{2} = \frac{3}{4} \cdot 2 = \frac{3}{2}$.

1.2 Yes, $y = 3.5x$. Every ratio $\frac{y}{x}$ equals 3.5.

1.3 250 miles. The unit rate is $150 \div 6 = 25$ miles per gallon, and $25 \cdot 10 = 250$.

Unit 2: Percents, tax, tips & simple interest

2.1 47.20 dollars. The tip is $0.18 \cdot 40 = 7.20$ dollars; or multiply $40 \cdot 1.18$.

2.2 25%. The change is 20 dollars, and $\frac{20}{80} = 0.25$.

2.3 60 dollars. $I = 500 \cdot 0.03 \cdot 4 = 60$, so the balance grows to 560 dollars.

Unit 3: Operations with rational numbers

3.1 2. $-7 + 12 = 5$, and $5 + (-3) = 2$.

3.2 -2 . Multiply by the reciprocal: $-\frac{3}{4} \cdot \frac{8}{3} = -\frac{24}{12} = -2$.

3.3 15 degrees. $9 - (-6) = 9 + 6 = 15$.

Unit 4: Expressions

4.1 $x + 2$. Distribute to get $6x - 8 - 5x + 10$, then combine $6x - 5x$ and $-8 + 10$.

4.2 $5(3y - 4)$. The greatest common factor of 15 and 20 is 5.

4.3 $p - 0.25p$ and $0.75p$. Taking off 25% leaves 75% of the price.

Unit 5: Equations & inequalities

5.1 $x = -4$. Subtract 9 to get $-4x = 16$, then divide by -4 .

5.2 $x = 7$. Divide both sides by 3 to get $x + 2 = 9$, then subtract 2.

5.3 $8 + 3r \leq 50$, so $r \leq 14$: at most 14 rides. Subtract 8 to get $3r \leq 42$, then divide by 3.

Unit 6: Scale drawings & angle relationships

6.1 42 miles. $3.5 \cdot 12 = 42$.

6.2 116° . $180 - 64 = 116$.

6.3 $x = 15$, and each angle is 55° . Vertical angles are equal, so $3x + 10 = 5x - 20$, which gives $30 = 2x$.

Unit 7: Circles, area, surface area & volume

7.1 $C = 10\pi$ cm (about 31.4 cm) and $A = 25\pi$ square cm (about 78.5). The radius is 5, so $A = \pi \cdot 5^2$.

7.2 120 cubic cm. $B = \frac{1}{2}(6)(4) = 12$, and $V = 12 \cdot 10 = 120$.

7.3 62 square inches. $2(5 \cdot 3 + 5 \cdot 2 + 3 \cdot 2) = 2(15 + 10 + 6) = 62$.

Unit 8: Probability

8.1 $\frac{1}{2}$. There are 5 blue out of 10 marbles.

8.2 $\frac{1}{6}$. Six of the 36 outcomes add to 7: (1, 6), (2, 5), (3, 4), (4, 3), (5, 2), (6, 1).

8.3 $\frac{3}{10}$, and about 60 reds. $\frac{18}{60} = 0.3$, and $0.3 \cdot 200 = 60$.

Unit 9: Statistics & sampling

9.1 No. It is biased, because basketball players are more likely to pick basketball. A random sample from the whole school would be better.

9.2 About 210. $\frac{28}{80} = 0.35$, and $0.35 \cdot 600 = 210$.

9.3 2 MADs. The means differ by $82 - 74 = 8$, and $8 \div 4 = 2$.