

# Necessary Skills for Students Entering 8/Algebra Compacted

You should have mastered your basic math facts (without a calculator).

You should be proficient with

- adding, subtracting, multiplying, and dividing fractions without a calculator
- adding, subtracting, multiplying, and dividing integers and rational numbers without a calculator
- the order of operations including exponents

## Specific Skills/Concepts

Ratios and Proportional Relationships

- Analyze proportional relationships and use them to solve real-world and mathematical problems.

The Number System

- Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.
- Know that there are numbers that are not rational, and approximate them by rational numbers.
- Solve real-life and mathematical problems using percents, percent increase/decrease, and percent error.

Expressions, Equations, and Inequalities

- Use properties of operations to generate equivalent expressions.
- Solve real-life and mathematical problems using numerical and algebraic expressions, equations, and inequalities.
- Understand the connections between proportional relationships, lines, and linear equations.
- Analyze and solve linear equations and linear inequalities.

Geometry\*

- Draw and describe geometrical figures and describe the relationships between them.
- Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.
- Understand congruence and similarity using transformations (rotations, reflections, translations, and dilations).
- Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.

Statistics and Probability\*

- Investigate chance process and develop, use, and evaluate probability models.

*\*Algebra does not teach or expand on these topics; mastery is expected already.*

You can check for on-line resources or go to a bookstore and get a workbook or two. Some on-line resources include

- [www.khanacademy.org](http://www.khanacademy.org)
- [www.youtube.com/user/MyWhyU](http://www.youtube.com/user/MyWhyU)
- [www.brightstorm.com/math](http://www.brightstorm.com/math) (may cost money after a certain number of uses)
- [www.ixl.com/math](http://www.ixl.com/math) (may cost money after a certain number of uses)
- You may or may not be able to access the Holt textbook on-line over the summer.

## Student Attributes for Math Success

### Demonstrates intellectual engagement.

- Perceives mathematics as a way of understanding — a view that mathematics must make sense, and is not a sequence of algorithms to be memorized and applied.
- Actively explores new ideas, posing questions about their meaning, significance, and implications.
- Recognizes patterns—as well as deviations—from previously learned patterns in data, diagrams, symbols, and words.
- Appreciates that abstraction and generalization are important sources of the power of mathematics.
- Is willing to take risks and be challenged as part of the learning process.
- Contributes to and benefits from group problem-solving activities.

### Takes responsibility for own learning.

- Attends nearly every class session and when absent, seeks ways to learn the material covered in class.
- Conscientiously prepares work assigned for class.
- Examines and learns from his or her errors and seeks help when needed.
- Takes advantage of available resources — class time, notes, textbook, assignments, tutoring services, supplemental materials.

### Perseveres when faced with time-consuming or complex tasks.

- Sets aside the time necessary to be successful.
- Is willing to work on problems that require time and thought, particularly problems that cannot be solved by mimicking a previously seen example.
- Successfully completes tasks that require organizing and implementing multiple steps, concepts, or techniques.
- Recognizes when an approach is unproductive and makes logical modifications to that approach or switches to another approach.
- Is convinced that effort is an important component of success in mathematics.

### Pays attention to detail.

- Correctly follows all parts of oral and written directions without needing additional reminders.
- Makes few notational errors, e.g., accidentally changing digits, dropping or altering algebra symbols, incorrectly positioning points on a grid, etc.