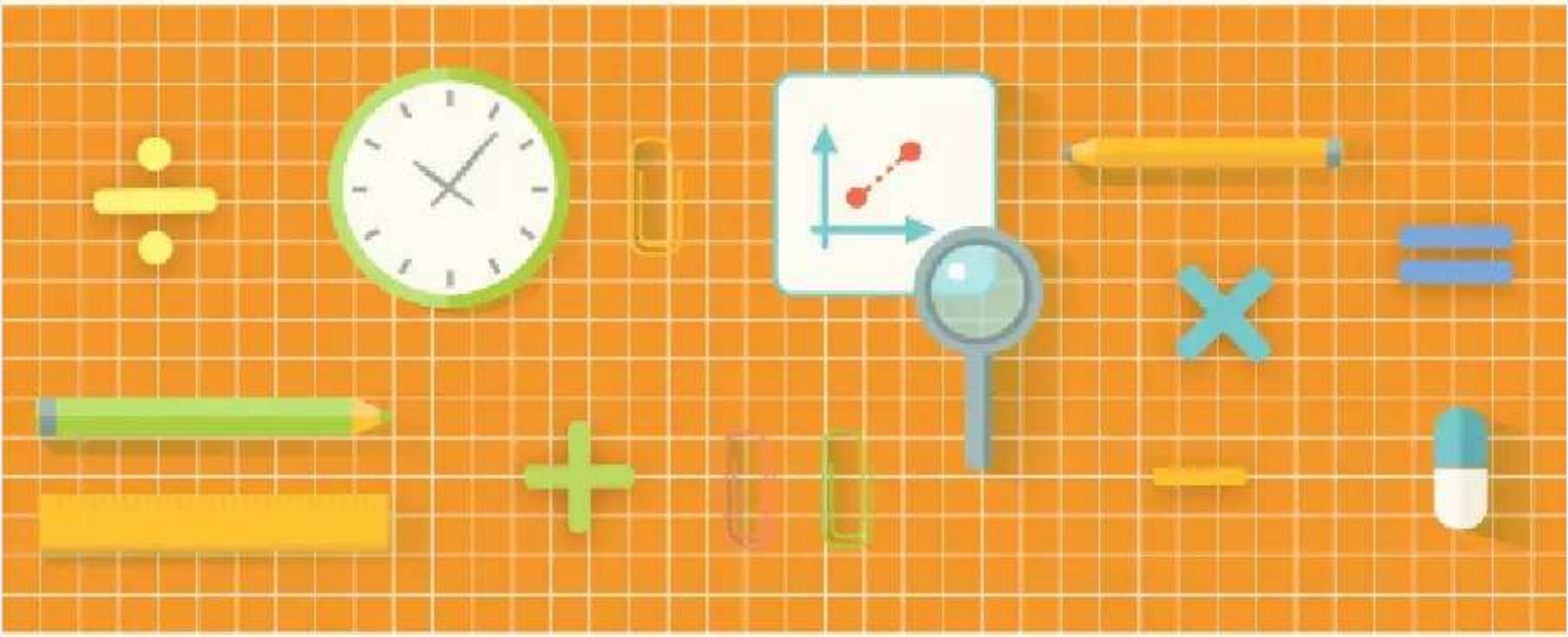
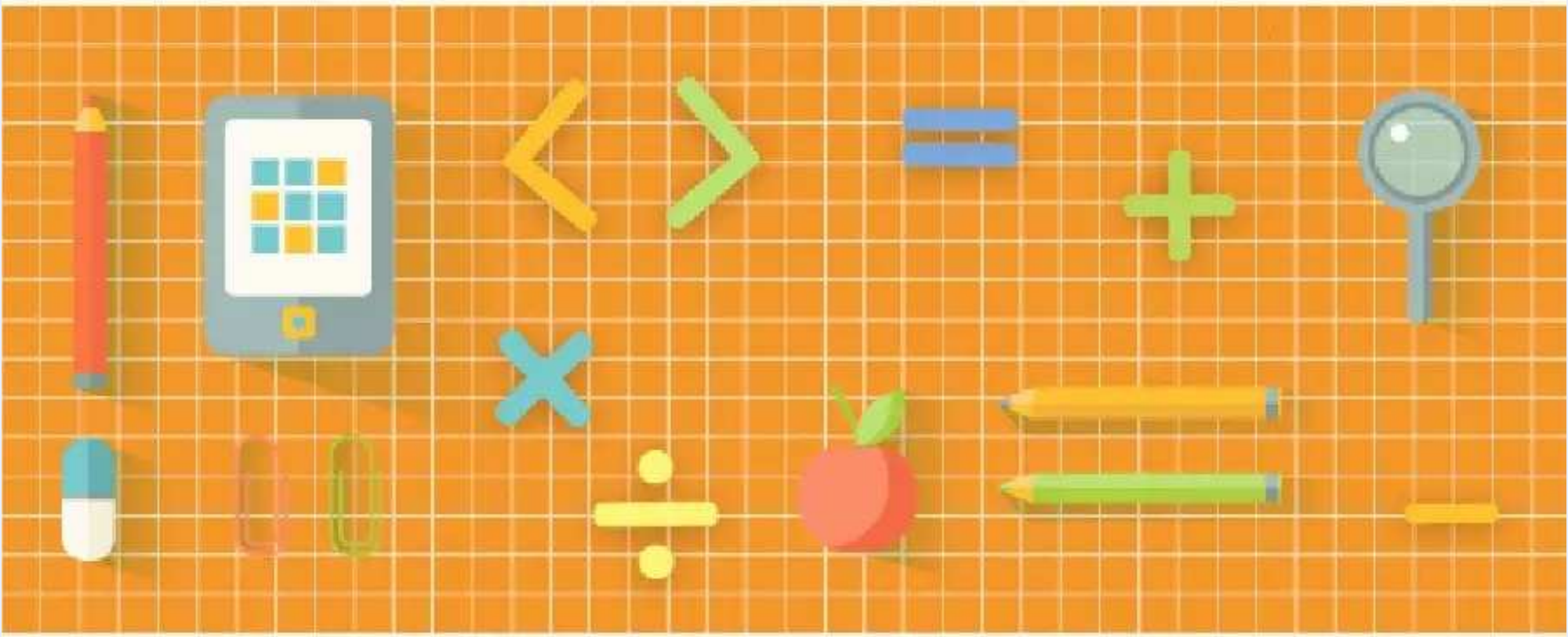


PARENTS' GUIDE TO

1ST GRADE MATH

+ PRACTICE WORKSHEETS



A Publication of

Tabtor™ Math

GRADE 1

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Many educators, politicians, and parents believe the instruction of mathematics in the United States is in crisis mode, and has been for some time. Indeed, recent test results show that American 15-year-olds were outperformed by 29 other countries on math testing scores.[1] To help counter this crisis, educational, civic, and business leaders worked together to develop the Common Core State Standards (CCSS). The goal of Common Core is to establish consistent, nationwide guidelines of what children should be learning each school year, from kindergarten all the way through high school, in English and math. Though CCSS sets forth these criteria, states and school districts are tasked with developing curricula to meet the standards.

The 2014-15 school year will be important for Common Core as the standards are fully implemented in many remaining states of the 43 (and the District of Columbia) that have embraced their adoption. CCSS has its advocates as well as its critics, and the debate on its merits has become more pronounced in recent months. Irrespective of the political differences with Common Core, its concepts are critical for students because the standards help with understanding the foundational principles of how math works. This guide steers clear of most of the controversy surrounding CCSS and primarily focuses upon the math your first-grader will encounter.

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[1]U.S. Students Slide in Global Ranking on Math, Reading, Science; NPR.org; Dec. 13, 2013

CCSS Review

A stated objective of Common Core is to standardize academic guidelines nationwide. In other words, what first-graders are learning in math in one state should be the same as what students of the same age are learning in another state. The curricula may vary between these two states, but the general concepts behind them are similar. This approach is intended to replace wildly differing guidelines among different states, thus eliminating (in theory) inconsistent test scores and other metrics that gauge student success.

An increased focus on math would seem to include a wider variety of topics and concepts being taught at every grade level, including first grade. However, CCSS actually calls for fewer topics at each grade level. The Common Core approach (which is clearly influenced by so-called "Singapore Math"—an educational initiative that promotes mastery instead of memorization) goes against many state standards, which mandate a "mile-wide, inch-deep" curriculum in which children are being taught so much in a relatively short span of time that they aren't effectively becoming proficient in the concepts they truly need to succeed at the next level. Hence, CCSS works to establish an incredibly thorough foundation not only for the math concepts in future grades, but also toward practical application for a lifetime.

For first grade, Common Core's focus is on addition and subtraction—the basic math facts they will use throughout their education and beyond—as well as learning how to measure without necessarily using a ruler, and how to understand shapes. Ultimately, this focus will enable children to develop rigor in real-life situations by developing a base of conceptual understanding and procedural fluency.

Critical Areas of Focus

First-graders likely will be encountering much more math than in the previous school year (especially at schools without full-day kindergarten). The extra time will be put to good use as students work toward mastering basic addition and subtraction skills and developing a better understanding on how numbers work. Here are the four critical areas that Common Core brings to first-grade math:

Addition and Subtraction

Students will use a variety of methods and strategies to gain a full comprehension of the concepts behind addition and subtraction. Approaches include length-based models (e.g. stringing cubes together to form lengths), counting to add or subtract (e.g., 5 + 3 = 8 is the same as counting 3 past 5), and making tens (e.g., with 8 + 7, count 2 more from 8 to get 10, and 2 fewer than 7 to get 5, then just add 10 + 5 to get the answer). Ultimately, the goal for kids is to become proficient with addition and subtraction within 20.

Place Value

The concept of two-digit numbers as a certain amount of tens and ones is introduced and emphasized (because understanding place value now will ease the transition to three- and four-digit numbers, and beyond, in future grades). Students will learn to add within 100 and subtract by multiples of 10.

Linear Measurement

Students will learn the meaning and processes behind measurement, and they will be taught iteration (mentally building the length of an object using equal-size units) and how to compare the measurements of objects.

Shapes

First-graders will work with shapes to understand their relationships. For example, students will learn that two triangles can be placed together to form a quadrilateral. Concepts such as congruence and symmetry are first introduced.

Overview of Topics

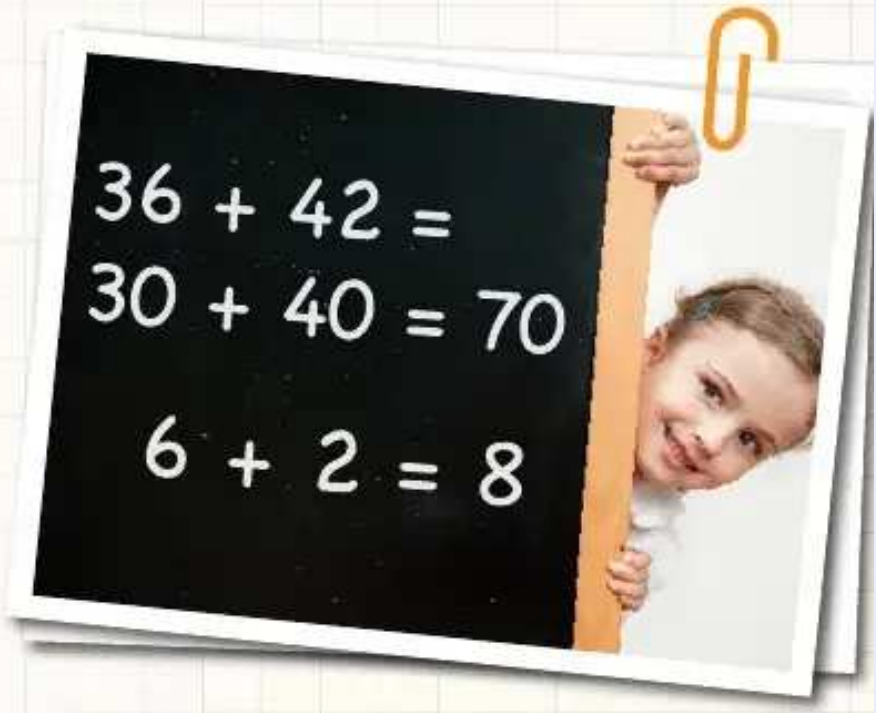
From the four critical areas of focus discussed in the previous section, Common Core also further clarifies the skills first-graders should know by the end of the school year. For example, the fluency requirement at this level is adding and subtracting within 10. The four topics presented here, taken directly from CCSS itself,[2] include some specifics on what kids will be taught in Grade 1.

Operations and Algebraic Thinking

- **Represent and solve problems involving addition and subtraction.** Equations with answers within 20 are emphasized, with strategies including adding to, taking from, putting together, taking apart, and comparing. Students will also solve word problems by applying these skills.
- **Understand and apply properties of operations and the relationship between addition and subtraction.** The commutative property of addition (5 + 9 is the same as 9 + 5) and associative property of addition (3 + 5 + 7 is the same as adding 3 + 7 to get 10, then adding 10 + 5) are explained. On the subtraction side, students will learn the answer to 9 - 5 is the same as adding that number to 5 to get 9.
- **Add and subtract within 20.** This is simply more emphasis on basic arithmetic facts with answers of less than 20. Students will understand the relationship between counting and addition/subtraction, as well as learn to use strategies to help them add (for example, arriving at an easier equation to solve a problem such as turning 4 + 6 into 4 + 4 + 2).
- **Work with addition and subtraction equations.** Students will learn about the equals sign and apply that knowledge to true/false questions (e.g., true or false: 3 + 6 = 6 + 3). Also, first-graders will solve problems in which, a part of an equation will be unknown, such as in 2 +__=4 (solve for the blank).

Number Operations in Base 10

- **Extend the counting sequence.** Students will learn to count, read, and write numbers up to 120.
- **Understand place value.** As already mentioned, students will apply place value principles for years to come, all the way through high school. In first grade, they will learn:
  - A two-digit number represents a certain number of tens and a certain number of ones (for example, 47 is 4 tens and 7 ones).
  - Ten can be thought of as a bundle of 10 ones.
  - Numbers between 11 and 19 are simply a ten plus an amount of ones.
  - Multiples of 10 up to 90 are the same as a single-digit amount of tens (e.g., 70 is the same as 7 tens and 0 ones).
  - How to compare 2 two-digit numbers based on what they have learned about place value.
- **Use place value understanding and properties to add and subtract.** While learning how to add a two-digit number to a one-digit number or 10, students will come to an understanding that they will add tens and tens together, then ones and ones, and sometimes have to compose a new ten to reach the answer (e.g., 36 + 42 = 30 + 40 = 70, 6 + 2 = 8. First-graders will also be taught how to mentally add 10 to a two-digit number and how to subtract multiples of 10 (within 90; e.g., 40 - 20 = 20).



Parents' Guide to 1st Grade
Math + Practice Worksheets

Measurement and Data

- **Measure lengths directly and by iterating length units.** Students will order three objects by length and indirectly compare the length of two objects by using the third. Also, first-graders will express the length of an object in units by using copies of a shorter object (for example, by measuring a long Lego block with smaller, equal-sized Legos).
- **Tell and write time.** Students will tell and write time, on analog and digital clocks, down to the half-hour.
- **Represent and interpret data.** First-graders will be taught to ask and answer questions on the total number of data points, how many of something are in a category, and how many more or less are in one category than another.

Geometry

- **Reason with shapes and their attributes.** The difference between defining attributes (a square has four sides) versus a non-defining attribute (that square is blue!) will be taught. Students will also compose two-dimensional and three-dimensional shapes and partition circles and rectangles into two or four equal shares, learning the terms halves, fourths and quarters along the way.

The Truth About CCSS and Performance

Common Core aims to improve educational performance and standardize what students should learn at every grade in preparation for a lifetime of application, but it does not set curricula, nor does it direct how teachers should teach. As with any educational reform, some teachers, schools, and school districts will struggle with CCSS, some will seamlessly adapt, and some will thrive. As a parent, your responsibility is to monitor what your first-grader is learning, discover what is working or isn't working for your child, and to communicate with his or her teacher—and to accept that your children's math instruction does differ from what you learned when you were younger, or even what they might have learned last year. The transition can be a little daunting for parent and student alike, but that's not a product of the standard itself. Common Core simply takes a new, more pointed approach to improving the quality of math instruction in this country.

The Benefits

As previously mentioned, CCSS decreases the number of topics students learn at each grade. However, the remaining topics are covered so extensively that the chances a child will master the corresponding skills increase. An analogy to this approach is comparing two restaurants. One restaurant has a varied menu with dozens of items; the other only serves hamburgers, fries, and milk shakes. The quality of the food at the first restaurant may vary upon the cooks' experience, the multitude of ingredients required for so many offerings, and the efficiency (or lack thereof) of the staff. Because the second restaurant only serves three items, mastering those three items efficiently should result in an excellent customer experience. That's not to say the first restaurant won't succeed (because many do), but there's always a chance that something on the menu won't live up to the business's own expectations.

By reducing the number of math topics taught, Common Core helps ensure students are truly ready for what comes next. Given the attention given to the included concepts, more practical applications and alternate operations of the math can be explored.

Coinciding with the reduction of topics is an emphasis on vigor—achieving a "deep command" of the math being taught. Students will be challenged to understand the concepts behind mathematical operations rather than just resorting to rote memorization and processes to get a right answer. Speed and accuracy are still important; kids won't be getting away that easily from flash cards and quizzes that increase fluency. Moreover, Common Core places even additional emphasis on practical application—after all, the math kids learn now will be important when they become adults, even if they never have to think about prime numbers or symmetrical lines in their day-to-day lives.

Finally, CCSS links standards from grade to grade so that the skills learned at one level translate into the tools they need to learn at the next level. This coherence would seem an obvious educational approach, but often, there is no link—students are taught a skill in first grade that might not be used (and might have to be re-taught) until third Each new concept in Common Core is an extension of a previous, already learned concept.

Math Practices to Help Improve Performance

In addition to the grade-specific standards it sets forth, Common Core also emphasizes eight "Standards of Mathematical Practice" that teachers at all levels are encouraged to develop in their students.[3] These eight practices, designed to improve student performance, are described here, with added information on how they apply to first-graders.

1 Make sense of problems and persevere in solving them

Students explain the problem to themselves and determine ways they can reach a solution. Then, they work at the problem until it's solved. This CCSS math practice encourages students to take their time to read and try understanding the problem, emphasizing that the process is ultimately important even if it doesn't result in a correct answer. This initiative is particularly crucial for first-graders, who are just learning to read and might naturally proceed slower while trying to solve a word problem. Students this age will also be encouraged to use pictures or objects to better visualize the problem and solution.

2 Reason abstractly and quantitatively

Students decontextualize and contextualize problems. By decontextualizing, they break down the problem into anything other than the standard operation. By contextualizing, they apply math into problems that seemingly have none. For example, first-graders may decontextualize an addition problem by using their fingers to arrive at an answer. Children this age who are contextualizing may see a picture with eight objects and visually break the image into two groups of 4 and 4 of the object.

[3]Standards for Mathematical Practice, Common Core State Standards Initiative

3 Construct viable arguments and critique the reasoning of others

Students use their acquired math knowledge and previous results to explain or critique their work or the work of others. First-graders might still be learning to read and write well, but they do know how to express themselves and may jump at the chance to answer a question out loud. Besides boosting their confidence, the ability to explain the math will increase their ability to excel at it.

4 Model with mathematics

This is just like it sounds: Students use math to solve real-world problems. First-graders can be challenged to take the math skills they have learned into their own lives. For example, a child trying to count his toy Hot Wheels cars may group them by tens to more easily arrive at an answer.

5 Use appropriate tools strategically

Another self-explanatory practice: Students learn and determine which tools are best for the math problem at hand. In first-grade, children will be taught so much arithmetic that knowing and using the appropriate symbols and signs (e.g., plus sign, minus sign, equals sign, and so on) is vital.

6 Attend to precision

Students strive to be exact and meticulous—period. As the focus in first grade turns toward mastering basic math facts, arriving at correct answers by any way possible takes on added importance. Furthermore, if a student can't come up with the right answer on a more complex problem, he should be taking steps to figure out how to solve (e.g. recognize place value: ones, tens, hundreds) or should ask for help.

7 Look for and make use of structure

Students will look for patterns and structures within math and apply these discoveries to subsequent problems. For example, first-graders who understand the bundling of tens might use that knowledge to easily add 11 to something (just add 1 to the tens place and 1 to the ones place).

8 Look for and express regularity in repeated reasoning

Students come to realizations—"a-ha" moments is a good term for these realizations—about the math operations that they are performing and use this knowledge in subsequent problems. For example, a first-grader might realize that adding 2 to an even number results in another even number, then use that knowledge to help develop her addition skills.

How to Help Your Children Succeed Beyond CCSS

Some of parents' trepidation with Common Core isn't so much with the guidelines themselves, but with the testing now aligned with CCSS via local math curricula. Standardized testing was stressful for students and parents before; with the ongoing Common Core implementation, many families simply don't know what to expect.

Fortunately, CCSS does not have to be that stressful, for you or your first-grader. Here are some tips to help your children succeed with Common Core math:

Be informed; be involved

If Common Core concerns you, intrigues you, or confuses you, don't hesitate to learn as much about it—in your child's classroom, at your kids' school, and on a national level. Talk with teachers, principals, and other parents. Seek advice on how you can help your kids, and yourself, navigate CCSS math. If you want to take further action, become involved with PTA or other organizations and committees that deal with your school's curriculum. The more you know, the more, ultimately, you can help your child.

Give them some real-world math

A basic tenet of Common Core is to apply math principles to real-world situations. Why not start now? Give your child math problems when you are out and about—the store, in traffic, the park, and so on. For example, if your first-grader plays soccer, have her separately count the players on your team and on the other team and tell you how many kids there are total.

Parents' Guide to 1st Grade
Math + Practice Worksheets

Take time to learn what they are learning

You might look at a worksheet your child brings home and think, "This isn't the math I'm used to." Because Common Core emphasizes understanding the process of arriving at an answer, your child may be taught additional ways to fry a mathematical egg, so to speak. Instead of shunning these approaches, learn them for yourself. Once you comprehend these additional methods, you will be better able to help your child comprehend them as well.

Encourage them to show their work

This suggestion can be read two ways. First, students will be encouraged to show how they arrived at an answer, especially within Common Core. Second, ask your children to show you their homework, particularly the challenging stuff. Explaining how a problem is solved is a basic CCSS tenet, so if your kids can be confident in explaining their work to you, they will carry that confidence into the classroom when the teacher asks for those same explanations.

Seek more help if necessary

If your first-grader is struggling with the new math standards, talk with his or her teacher first. You then might want to seek outside resources to help your child. Several online resources provide math help, including worksheets and sample tests that conform to Common Core standards. Tutoring might be an option you consider as well. Innovative iPad-based math programs have emerged that combine the personalized approach of a tutor with today's technology. This revolutionary approach also may feature a curriculum based on Common Core, thus ensuring your child's learning at home is aligned with what he or she is learning at school.

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Parents' Guide to 1st Grade
Math + Practice Worksheets

Operations and Algebraic Thinking

1 7 + 5 + 8

2 Select the number sentence that is the same as 8 plus 4

A) 8 + 4
B) 8 − 4
C) 8 + 8
D) 4 + 4

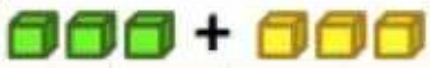
3 Megan bought 5 ice cream cones and 4 ice cream bars. How many total ice creams did Megan buy?

4 Choose the sign which makes the equation true

10 ___ 6 = 4

A) +
B) −
C) =

5 Select the image that shows the commutative property for 

A)  B)  C) 

6 An artist painted 5 pictures on Tuesday, 3 on Thursday and 9 on Saturday. How many pictures did he paint?

7 Alice bought 13 bulbs. She gave 5 away to her friend. How many bulbs does Alice have now?

8 Find the missing numbers

5 + 5 + 4 = 10 + _ = _

9 Use the given equation to find the missing numbers

3 + 5 = 8

8 − _ = 5

8 − _ = 3

10 Is this equation true or false?

3 − 1 = 4 − 2

A) True
B) False

Number Operations in Base 10

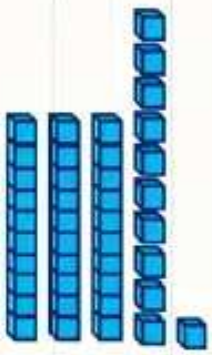
1 Select the number word for the number

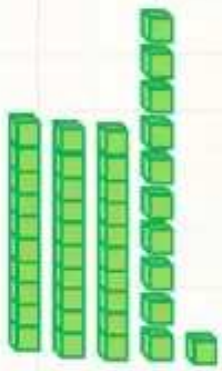
A) Thirty three B) Twenty nine C) Twenty two D) Three

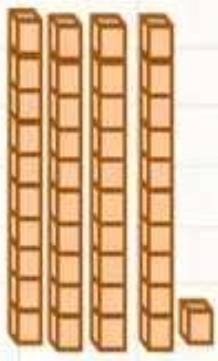
2 Enter the previous 4 numbers
49, _, _, _, _

3 58 = _ tens + _ ones

4 Select the images which represent 41

A) 

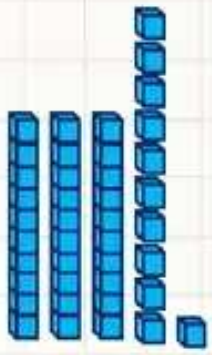
B) 

C) 

5 Count the number of cups

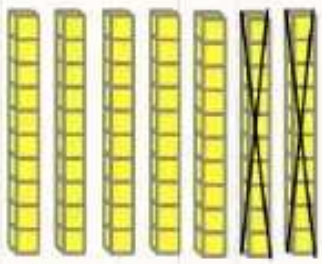
6 How many tens are in 73?

7 Select the number name which represents the number of blocks shown



A) Thirty three B) Forty one C) Nineteen D) Forty eight

8 Find the missing number
7 tens - 2 tens = _ tens



9 Fill in the missing numbers
20, 30, 40, _, _, 70

10 Jack's house has 30 lights. If 10 of them are not working, how many lights are working?

Parents' Guide to 1st Grade
Math + Practice Worksheets

Measurement and Data

1 Select the lightest one.

A)  B)  C) 

2 Megan's pencil is longer than Andy's pencil. Andy's pencil is longer than John's pencil. Whose pencil is the longest?

A) Megan

B) Andy

C) John

D) Can't say

3 How many paper clips equal the length of the flag?

4 Ria's school starts at half past eight. Enter the answer in hh:mm format.

5 Enter the answer in hh:mm format. In an office, lunch time is at half past twelve.

6 John's Math class is half hour long. It starts at 11:00 am. At what time will his class end?

7 Count the total number of cupcakes

Susan went to the market and bought the items shown below.

Cupcakes	
Orange Juice	
Donuts	

8 How many total items did she buy on Monday?

Sunday	
Monday	
Tuesday	

9 Kate counted the different birds in a garden during different weeks and noted down her observations.

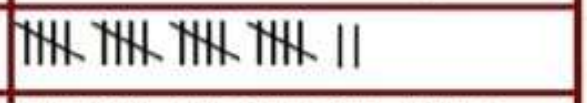
In which week did she observe the least number of birds?

A) Week 1 B) Week 2 C) Week 3

Week 1	
Week 2	
Week 3	

10 A baker sells the following over the weekend.

How many ice cream cones did he sell over the weekend?

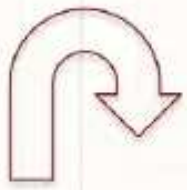
Parents' Guide to 1st Grade
Math + Practice Worksheets

Geometry

1 The shape shown is

A) Open
B) Closed
C) Both open and closed

2 How many straight lines does the image have?



3 Select the odd one out

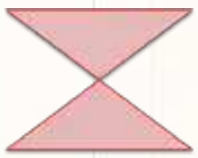
A) 

B) 

C) 

D) 

4 Select all images that are closed and have at least 4 vertices

A) 

B) 

C) 

D) 

5 I have no flat faces and when you look at an orange, you will remember me. What shape am I?

A) 

B) 

C) 

6 Select all the shapes you can find in the image

A) Circle
B) Rectangle
C) Pentagon
D) Octagon

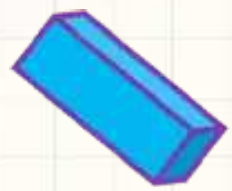
7 Identify all the shapes in the given image

A) Trapezoid
B) Circle
C) Square
D) Triangle

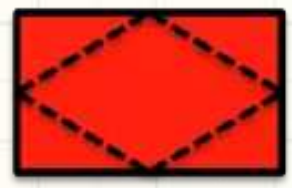
8 Select the shapes that you can make with 4 triangles.

A) 

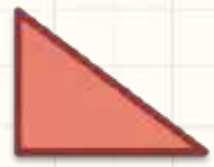
B) 

C) 

9 How many parts is this shape divided into?



10 Select all images that represent half a rectangle.

A) 

B) 

C) 

Answer Key

Operations and Algebraic Thinking

1. 20
2. A)
3. 9
4. A)
5. B)
6. 17
7. 8
8. 4, 14
9. 3, 5
10. A)

Number Operations in Base 10

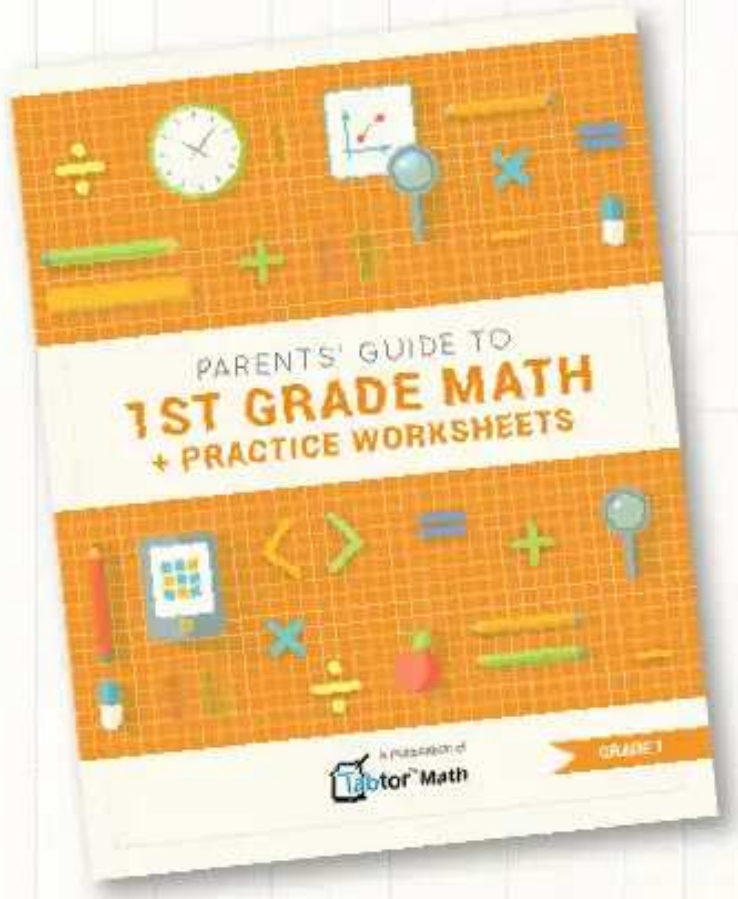
1. B)
2. 48, 47, 46, 45
3. 5, 8
4. A), B), C)
5. 31
6. 7
7. B)
8. 5
9. 50, 60
10. 20

Measurement and Data

1. A)
2. A)
3. 4
4. 8:30
5. 12:30
6. 11:30am
7. 17
8. 9
9. B)
10. 31

Geometry

1. A)
2. 5
3. A)
4. A), C)
5. A)
6. A), B)
7. C), D)
8. A), B)
9. 5
10. A)



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