Math Tips for Parents

GRADES K-5

MATHNASIUM®
The Math Learning Center

INTRODUCTION

This booklet is to be used as a guide for parents to help their children **understand, master and love math** — that's the Mathnasium mission.

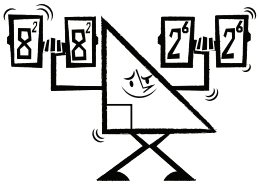
You can begin these strategies as early as kindergarten, 1st, and 2nd grade. They are appropriate for people of any age who need help with basic mathematics concepts and skills. The trick is to do these exercises both *orally* and *visually*, with little or no writing. Pictures can be used as visual aids. Real-world objects (coins, blocks …) should be used as appropriate.

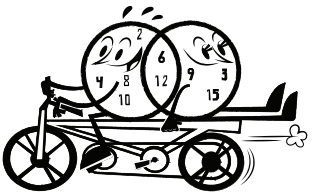
COUNTING

The most basic skills in mathematics are *counting* and *grouping* ("seeing" numbers in groups). To develop counting skills, help children learn to count *from* any number *to* any number *by* any number — forward and backward.

- Count by 1s, starting at 0 (0, 1, 2, 3 … 250 …),
  ↳ then starting at any number [e.g., 28, 29, 30 … 40 …].
- Count by 2s, starting at 0 (0, 2, 4, 6 … 24 …),
  ↳ then starting at 1 (1, 3, 5 … 25 …),
  ↳ then starting at any number [e.g., 23, 25, 27 … 49 …].
- Count by 10s, starting at 0 (0, 10, 20 … 500 …),
  ↳ then starting at 5 (5, 15, 25 … 205 …),
  ↳ then starting at any number [e.g., 37, 47, 57, 67 … 347 …].
- Count by 5s, starting at 0 (0, 5, 10 … 250 …),
  ↳ then starting at any number [e.g., 13, 18, 23, 28, … 128 …].
- Count by $\frac{1}{2}$s, starting at 0 (0, $\frac{1}{2}$, 1, $1\frac{1}{2}$ … 5 …),
  ↳ then by $\frac{1}{4}$s, starting at 0 (0, $\frac{1}{4}$, $\frac{2}{4}$ [$\frac{1}{2}$], $\frac{3}{4}$, $\frac{4}{4}$ [1], $1\frac{1}{4}$ …),
  ↳ then by $\frac{3}{4}$s, starting at 0 (0, $\frac{3}{4}$, $\frac{6}{4}$ [$1\frac{1}{2}$], $\frac{9}{4}$ [$2\frac{1}{4}$], $\frac{12}{4}$ [3] …).
- Count by 15s, starting at 0 (0, 15, 30 … 120 …).
- Count by 3s, 4s, 6s, 7s, 8s, 9s, 11s, 12s, 20s, 25s, 50s, 75s, 100s, and 150s, starting at 0.
  ↳ then starting at any number.

The benefits of this type of counting practice are strong addition skills and the painless development of times tables.





GROUPING

To expand children's thinking processes and help them "see" groups, ask questions like:

- "7 and how much more make 10?", "70 and how much more make 100?", "700 and how much more make 1,000?"
- "10 and how much more make 15?", "10 and how much more make 18?", "10 and how much more make 25?"
- "17 and how much more make 20?", "87 and how much more make 100?", "667 and how much more make 1,000?"
- "How far is it from 6 to 10?", "How far is it from 89 to 100?", "How far is it from 678 to 1,000?"
- "How many 10s are there in 70? … 100? … 200? … 340? … 500? … 1,000? … 10,000? … 1,000,000? … a quadrillion (there are 15 zeros)?"
- "How many 4-person teams can you make out of 20 kids? … 100 kids? … 50 kids?"
- "How much is 5, four times? … ten times? … a hundred times? … a thousand times?"

Notice how these questions focus on the number 10, multiples of 10, and powers of 10. These exercises can all be done by counting *mentally*, and do not require students to do pencil-and-paper computations.

FRACTIONS

As counting skills begin to develop, fractions can be introduced. Long before introducing words like *numerator* and *denominator*, teach children that half means "two parts the same," and have them use this knowledge to figure out problems like:

- "How much is half of 6? … 10? … 20? … 26? … 30? … 50? … 100? … 248? … 4,628?"
- "How much is half of 3? … 11? … 15? … 21? … 49? … 99? … 175? … 999? … 2,001?"

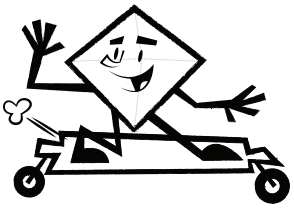
As the ability to split numbers in half develops, add questions like:

- "How do you know when you have half of something?"
- "Half of what number is 4? … 25? … $2\frac{1}{2}$?"
- "How many half sandwiches can you make out of three whole sandwiches?"
- "How much is 2 plus $2\frac{1}{2}$?", "How much is $3\frac{1}{2}$ plus 4?"
- "How much is 7 take away $2\frac{1}{2}$?", "How much is $7\frac{1}{2}$ take away 2?"
- "How much is $2\frac{1}{2}$ four times? … eight times? … two-and-a-half-times?"
- "How much is a half plus a quarter?"
- "What part of 12 is 6? … is 4? … is 3? … is 1? … is 9? … is 12? … is 24? … is 30?"

Don't be afraid to ask these questions of kindergarteners and 1st graders. The ability to "see" a whole as being a collection of parts should be learned in the early grades.

PROBLEM-SOLVING

Children become good problem solvers when they are asked to solve a broad range of problems early on, at home and at school. Start with easy questions; let the level of difficulty increase as the child's ability grows.



Ask children questions like:

- "I'm 38 years old, and you are 6. How old will I be when you are 10?"
- "If 3 pieces of candy cost 25 cents, how much do 6 pieces cost? … 9 pieces?"
- "How many pieces can you buy for a dollar?"
- "Which would you rather have: 1 piece of candy bar cut into 3 equal-size pieces, or 1 piece of the same candy bar cut into 6 equal-size pieces? Why?"
- "How can you share 6 candy bars evenly with 3 kids?"
- "How can you share 2 candy bars evenly with 3 kids?"
- "A boy and a girl went to the movies. They spent half of the money they had for their tickets, and they spent half of what they had left on snacks. Finally, they had $5.00 left. How much money did they start with?"

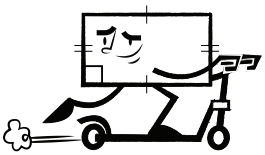
Questions like these help animate a child's thought process. Try it. You'll see!

MONEY

By the end of 2nd grade, children should know the names and values of the U.S. coins:

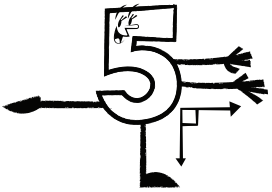
- a penny = 1 cent
- a nickel = 5 cents
- a dime = 10 cents
- a quarter = 25 cents
- a half-dollar = 50 cents
- a whole (silver dollar) = 100 cents

Preschool and kindergarten are appropriate times to begin this training. Parents can also do this with their children at home.



By the end of 3rd grade, children should know the basic equivalents:

- 100 pennies = 20 nickels = 10 dimes = 4 quarters = 2 half-dollars = 1 dollar
- 1 dime = 2 nickels
- 1 quarter = 5 nickels
- 1 half-dollar = 5 dimes = 10 nickels

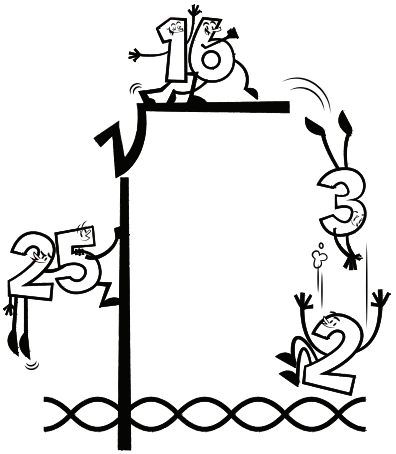


Other combinations, like 3 quarters = 15 nickels, or 15 dimes = 6 quarters, should also be explored. Next come questions like, "How many dimes have the same value as 6 quarters? … 40 quarters?"

Gathering and counting coins is an excellent way to develop these skills.

"Making Change" is a skill that can be introduced in late 1st grade or early 2nd grade, and it can be mastered by 4th grade. Children should learn to make change from:

- a dime
- a quarter
- a half-dollar
- one dollar
- five (… ten … twenty … fifty … hundred …) dollars



Questions can take the form of:

- "You have a dime. If you spend 6 cents, how much will you have left?"
- "If you want to buy something that costs 50 cents, and all you have is 47 cents, how much more do you need?"
- "If you want to buy something that costs a dollar, and all you have is 78 cents, how much more do you need?"
- "If you buy something that costs 18 cents, how much change will you get from $2.00?"
- "If you buy something that costs $1.46, how much change will you get from $2.00?"
- "If you buy something that costs $12.89, how much change will you get from a twenty-dollar bill?"

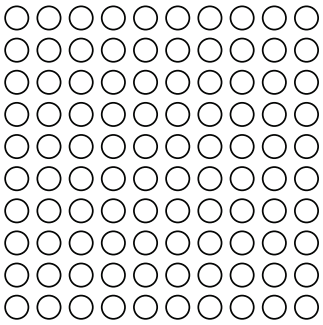
Other money-related questions:

- "A roll of dimes is worth $5.00. How many dimes are in a roll?"
- "A roll of quarters contains 40 quarters. How much is the roll worth?"

Money is the best model of our base 10 (decimal) number system.

VISUAL ELEMENTS

Pictures are useful in presenting and reinforcing many concepts.



- "How many circles are there in the picture?"
- "If each circle is a penny, how much money is shown in the picture?"
- "If each circle is a dime (… a nickel … a quarter …), how much money is shown in the picture?"
- "Shade in half of the circles. How many circles are not shaded in?"
- "Shade in half of the circles that are not shaded in. Now how many circles are not shaded in?"
- "Again, shade in half of the circles that are not shaded in. Now how many circles are not shaded in?"

LEARNING ADDITION AND SUBTRACTION FACTS

Here is a structure for learning addition and subtraction facts.

ADDITION

"Counting on (start at *x* and count up by *y*)"

1) 7 + 2 = _____ 2) 8 + 3 = _____

"Doubles"

3) 5 + 5 = _____ 4) 9 + 9 = _____

"Doubles plus 1" "Doubles minus 1"

5) 5 + 6 = 5 + 5 + 1 = _____ 6) 8 + 7 = 8 + 8 – 1 = _____

"Breaking down numbers"

7) 6 + _____ = 9 8) _____ + 7 = 11

"Combinations that make 10"

9) 8 + 2 = _____ 10) 6 + 4 = _____

"10 plus a number"

11) 10 + 7 = 17 12) 10 + 9 = 19

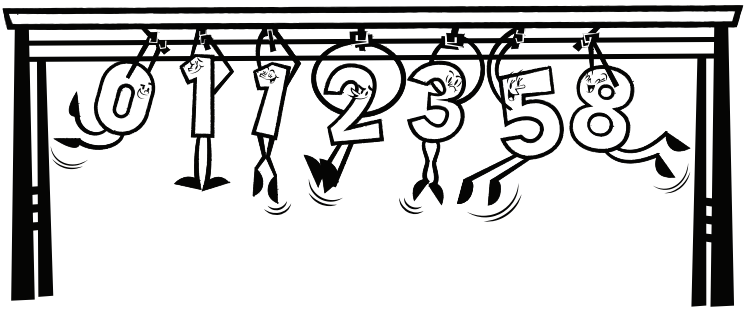
"10 plus what number?"

13) 10 + _____ = 16 14) 10 + _____ = 19

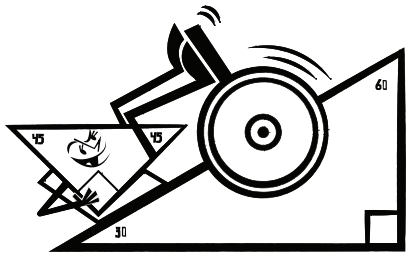
"Putting it all together"

15) "8 + 6 = _____": "8 plus how much makes 10" (**2**) … [6 – **2** = **4**] … 10 plus the left-over (**4**) … 10 + **4** = 14

16) "9 + 7 = _____": "9 plus how much makes 10" (**1**) … [7 – **1** = **6**] … 10 plus the left-over (**6**) … 10 + **6** = 16



SUBTRACTION



Subtraction has two aspects:

- the notion of "how much is left," and
- the notion of "how far apart are the two numbers" (*how far is it* from the smaller number *up to* the bigger number).

Use the notion of "how much is left" when the numbers are fairly far apart and count down.

> For example, "12 – 3" is best thought of as "counting down from 12 by 3."

On the other hand, use the notion of "how far apart are the two numbers" when the numbers are fairly close to each other, and count up.

> For example, "12 – 9" is best thought of as "how far is it from 9 up to 12?"

After a good deal of practice with both methods, your child will use the right one automatically as they do these types of problems.

Try these:

1) Which method would you use for "100 – 98"? **(CIRCLE ONE)**

   HOW FAR APART **HOW MUCH IS LEFT**

2) Which method would you use for "100 – 3"? **(CIRCLE ONE)**

   HOW FAR APART **HOW MUCH IS LEFT**

3) Which method would you use for "100 – 87"? **(CIRCLE ONE)**

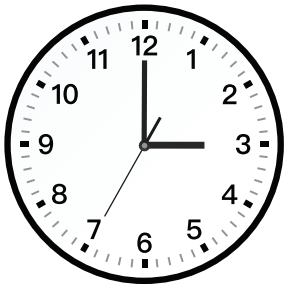
   HOW FAR APART **HOW MUCH IS LEFT**

3) Which method would you use for "100 – 15"? **(CIRCLE ONE)**

   HOW FAR APART **HOW MUCH IS LEFT**

LEARNING TO "TELL TIME"

In our modern era, it is tempting to let our young children learn to tell time on a digital watch or a digital clock.



Digital timepieces definitely have their place, *after* students have learned all of the benefits that can be derived from learning the ins and outs of reading an analog (a "round") clock.

Here are a few of the benefits of learning to tell time on an analog clock.

- "Half past," "quarter 'til," and "three quarters of an hour" are easy to visualize on a "round" clock.
- The notions of "clockwise" and "counterclockwise" are transparent on an analog clock. While most adults take this for granted — be forewarned — it is a learned skill.
- The imagery of the "big hand" sweeping through 90° at 3:00 and 9:00, 120°, 270° and 360° cannot be reproduced on a digital watch.
- The visualization of the angles between the hands of an analog clock is an excellent pre-geometry skill (90° at 3:00 and 9:00, 120° at 4:00 …).
- "Elapsed time" is much easier to "see" on a round clock.
- Counting by 5s, 10s, 15s, 30s, and 60s is greatly facilitated by being able to see the numbers on a round clock.

Eventually, students need to learn to deal with both systems. Make sure your child gets lots of practice outside the classroom, especially in dealing with analog ("round") clocks.

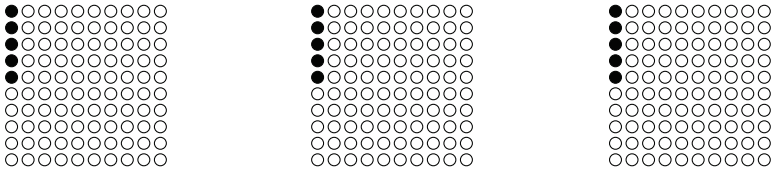
A DIFFERENT WAY TO THINK ABOUT PERCENT

"**Per**" means "***for each***," and **cent** means "***100***." So **percent** means "***for each 100***."

EXAMPLE: Find **5**% of **300**.

5% means "5 for each 100." ***So count ...***

5 for the *first* 100, **5** for the *second* 100, and **5** for the *third* 100.



5 + **5** + **5** = **15**

So, **5% of 300 is 15**.

Try these:

1) 7% of 300 = _____
2) 6% of 500 = _____
3) 15% of 300 = _____
4) 25% of 400 = _____
5) 20% of 500 = _____
6) 12% of 300 = _____
7) 6% of 200 = _____
8) $6\frac{1}{2}$% of 200 = _____
9) 8% of 50 = _____
10) 7% of 50 = _____
11) 6% of 150 = _____
12) 12% of 250 = _____
13) 8% of 225 = _____
14) 7% of 250 = _____

CONCLUSION

By using these math tips and engaging your child at home, you'll help your child feel more confident in math, improve their understanding, and spark their love of learning math. That's what Mathnasium is all about!

MATHNASIUM'S PHILOSOPHY:

Children don't hate math. They hate being confused and intimidated by math. With understanding comes passion. And with passion comes growth — a treasure is unlocked.

MATHNASIUM®
The Math Learning Center

HOW MATHNASIUM BEGAN

In the 1990s, education industry pioneers **Peter Markovitz** and **David Ullendorff** recognized that, to truly be successful in school and in life, students need a solid understanding of mathematics. There was a vast disconnect, though, between students' learning skills and the math curriculum they were taught in school.

To address that gap, they founded Mathnasium — a math-only learning center committed to providing the world's best instruction. Their goal: teach children how to think, with the skills to succeed in math and the confidence to achieve their academic potential.

After an exhaustive search, they found the perfect person to help them achieve their vision: **Larry Martinek**, a beloved educator, teacher trainer and curriculum consultant. Larry and Mathnasium's expert team spent years refining the most powerful teaching methods and materials into the comprehensive, industry-leading **Mathnasium Method**™.

The trio opened the first Mathnasium Learning Center in Los Angeles in late 2002 and began franchising in 2003. The extraordinary dedication of Mathnasium's local center owners and staff, combined with Mathnasium's child-centered approach, proved wildly successful. Mathnasium has become an award-winning, world-class math education company, and global demand for our service has soared.

Today, Mathnasium changes the lives of more than 100,000 children in neighborhood learning centers on five continents.

Mathnasium is your neighborhood math-learning center. Whether your child struggles with fundamental concepts or wants to challenge themselves through enrichment opportunities, we can transform their understanding of math. We do it in a positive environment that children love. And we give them critical thinking and problem-solving skills they need to succeed in class and in life.

The Mathnasium Method™

COMPREHENSIVE ASSESSMENTS

- Oral and written diagnostics pinpoint exact strengths and weaknesses
- Evaluations are conducted regularly to confirm skills retention and guide learning plan updates
- Results are shared with parents upon joining and in progress reports

FULLY CUSTOMIZED LEARNING PLAN

- Approach builds upon student's knowledge and fills in foundational gaps
- Mental, verbal, visual, tactile, and written teaching methods adapt to any learning style
- Time-tested, proprietary materials and instruction ensure individual mastery

EXPERTS WITH A PASSION FOR TEACHING CHILDREN

- Provide face-to-face instruction
- Teach at the perfect pace for each child
- Build confidence through care and encouragement
- Use Socratic questioning to foster independent learning and problem-solving