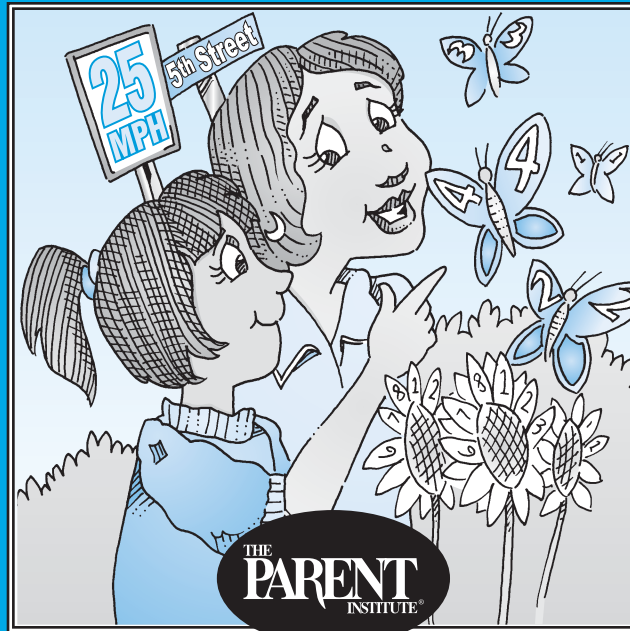


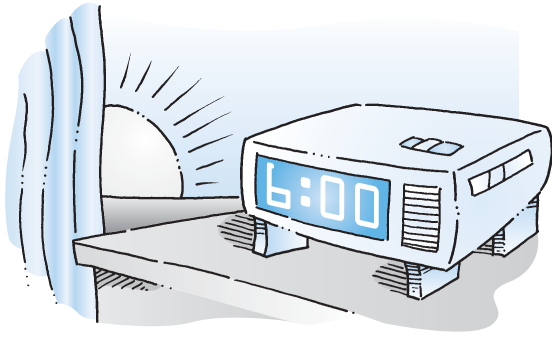
What Parents Can Do at Home *to* Help Students With Math

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One of a Series of Booklets for Parents



Math is around us all the time. And in today's high-tech society, everyone needs a strong foundation in math to be successful. Workers need quick reasoning and problem-solving skills. They need to estimate and use mathematical thinking.

Even calculators and computers, which some said would make math outdated, require students to have good math skills. In fact, because calculators are only as accurate as the people operating them, these machines make it even more important for students to have strong mental math skills so they can tell quickly if the answer is correct.

Sometimes, children don't see how useful math can be. Parents can help. When you or your child use math in your everyday activities, point it out. Did your child glance at the clock to see how many minutes remain before his favorite TV show? That's math. Did he figure how many weeks' allowance it will take before he can buy a new video game? That's math, too.

Whether you're looking for extra math activities to enjoy with your child or advice on how to help a struggling student do better, the activities in this booklet should help. By working on these activities with your child, he* can develop a healthy interest in math, an appreciation of why math is useful and a positive attitude about studying math in school.

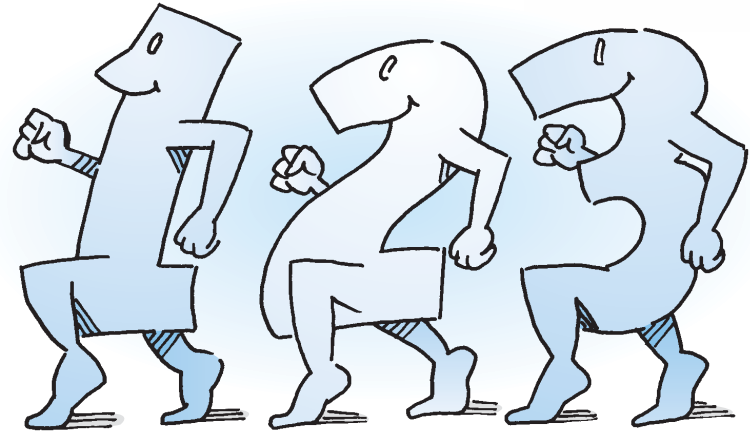


**Every child is unique, so we often use the singular pronoun. We'll alternate using "he/him" and "she/her" throughout this booklet.*

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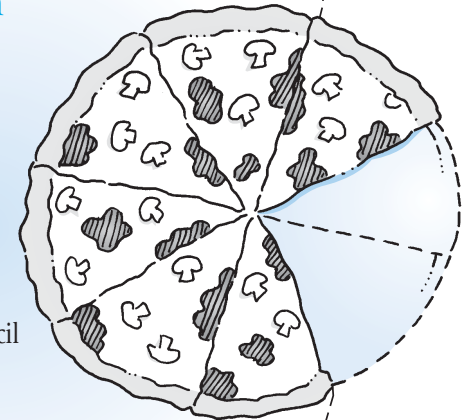
Take a Math Walk

When you and your child walk in your neighborhood, count the number of animals, birds, fire hydrants or green cars you see. Look for geometric shapes—circles, right angles, cones and so on—in the windows and buildings. Estimate how far you'll walk—later, perhaps you can check with a car odometer.



Ask a Silly Question

Try making math fun by asking your child silly questions that require math to answer them: "How many minutes are there until your birthday?" "What percent of the pizza did Dad eat tonight?" After you ask the question, ask your child how she could find the answer. Have her solve the problem with pencil and paper or a calculator. Challenge each other to think of new fun questions.



There's More Than One Right Way to Get the Answer

Children sometimes think that because there's only one correct answer to a math problem, there's only one way to come up with the answer. In fact, there may be many ways to get the right answer. When you're studying math at home with your child, stop often to ask, "How did you get the answer?" Your child's way may be different from yours. If the answer is correct, his method may be a great alternative. Getting children to think about *how* they solve problems makes them better mathematicians.

$$5 \times 2 \quad 2 \times 5$$



Use Manipulatives

What's the difference between 5×2 and 2×5 ? Both problems give the same answer—but the groupings are different. Children of all ages can often understand math concepts if they have a chance to see, move and use objects.

Teachers call these objects *manipulatives* because they give children a chance to move them around as they are learning about a math concept. You can create your own math manipulatives. Look for something small—raisins, paper clips, beans, even candy pieces.

To help your child see the difference between 5×2 and 2×5 , have him group ten raisins—first into five groups of two, then into two groups of five. As he moves the manipulatives around, he'll begin to understand how the two problems are different, even though they have the same answer.

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Stress Mental Math

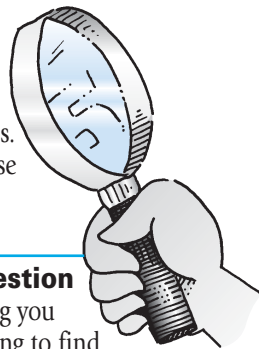
Calculators and computers are great, but the people using them still need to know if the answer they give is reasonable. So children need the ability to do mental math—coming up with an estimate of the answer in their heads. Here are some ways to foster mental math skills:

- **Ask your child** to give you a quick answer to lots of small math problems. For example, "I've put in four cups of flour, but the recipe calls for seven. How many more do I need?" "I need to bring 24 drinks for your class party. They come in packages of six. How many packages should I buy?"
- **Teach your child** to estimate an answer. Sometimes, that means using numbers that make it easier to do a problem in your head. It's hard to add 18 and 29 quickly, but it's easy to add 20 and 30. So the answer to 18 plus 29 should be about 50.
- **Ask often**, "Is the answer reasonable?" Is it reasonable to add 17 and 35 and get 367? Why or why not?
- **Ask for your child's help** as you use math. At the grocery store, ask your child to weigh vegetables, count items in the cart, compare unit prices or estimate your total grocery bill. Or use coupons to teach math. Ask, "If this coupon gives us 25 cents off, what will the final price be?"



Here's the Secret to Solving Word Problems

Even kids who do well in math can sometimes get confused by word problems. Help your child follow these five steps when solving any word problem.



- **Step 1: Figure out the question** you need to answer. The first thing you need to know is what you are trying to find. (Often, this is the last sentence of the problem.)
- **Step 2: Write down the information** needed to solve the problem. A word problem includes all the information needed to answer the question (although it may also include some extra information).
- **Step 3: Develop a plan** to solve the problem. There may be one step to solving the problem, or several. It may be possible to use a diagram or a table. It's important to have a clear plan in mind before solving the problem.
- **Step 4: Solve the problem.** Make sure you check your plan so you don't leave out any steps.
- **Step 5: Check your work.** Did you answer the problem completely? Reread the problem to see if your answer makes sense. Check your answer to make sure you haven't made a simple error.



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Here's how your child might use the five-step plan to solve the following word problem:

Each Monday of the month for six months you have put $\frac{1}{10}$ of your allowance in your pink piggy bank. If you now have \$7.00 in your piggy bank, how much allowance have you earned?

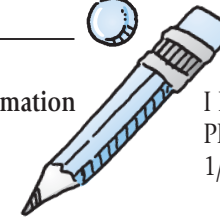
My 5-Step Plan for Solving Word Problems

Step 1: Figure out the question I need to answer.



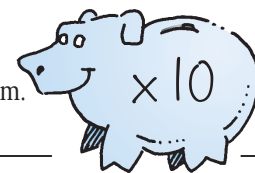
HOW MUCH ALLOWANCE HAVE I EARNED?

Step 2: Write down the information needed to solve the problem.



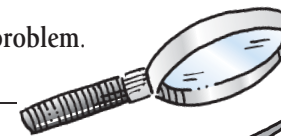
I HAVE SAVED \$7.00 IN MY PIGGY BANK. I HAVE SAVED $\frac{1}{10}$ OF MY ALLOWANCE.

Step 3: Develop a plan to solve the problem.



MULTIPLY THE AMOUNT IN MY PIGGY BANK BY 10.

Step 4: Solve the problem.



$\$7 \times 10 = \70

Step 5: Check my work.



YES, THE ANSWER IS CORRECT.

You may want to make a copy of these 5 steps and keep it handy for the times when your child is solving word problems.



Thinking Games Build Math Skills

Math involves a specific way of thinking. You can use games to help your child build the thinking skills needed in this important subject. Here are some ideas:

- **Help your child see patterns.** For example, ask your child to figure out the next number in this series:

10 11 13 16 20 25 _____
(The correct answer is 31—add 1, then 2, then 3, and so on)

- **What's the next number in this series?**

72 27 56 65 41 _____
(The correct answer is 14—reverse the digits.)

- **Use math to crack a coded message.**

The key to this code is that each letter has a numerical value starting with A=1, B=2, C=3, etc. to Z=26. Then the number code for each letter is multiplied by five, so that the code for "A" becomes 5 ($1 \times 5 = 5$), the code for "B" becomes 10 ($2 \times 5 = 10$), etc. Using that key to the code, see if you can decipher the following message:

125-75-105 35-75-100
45-100 90-45-35-40-100!

**Answer:
YOU GOT IT
RIGHT!**

- **Can you and your child make up** your own math-based code?

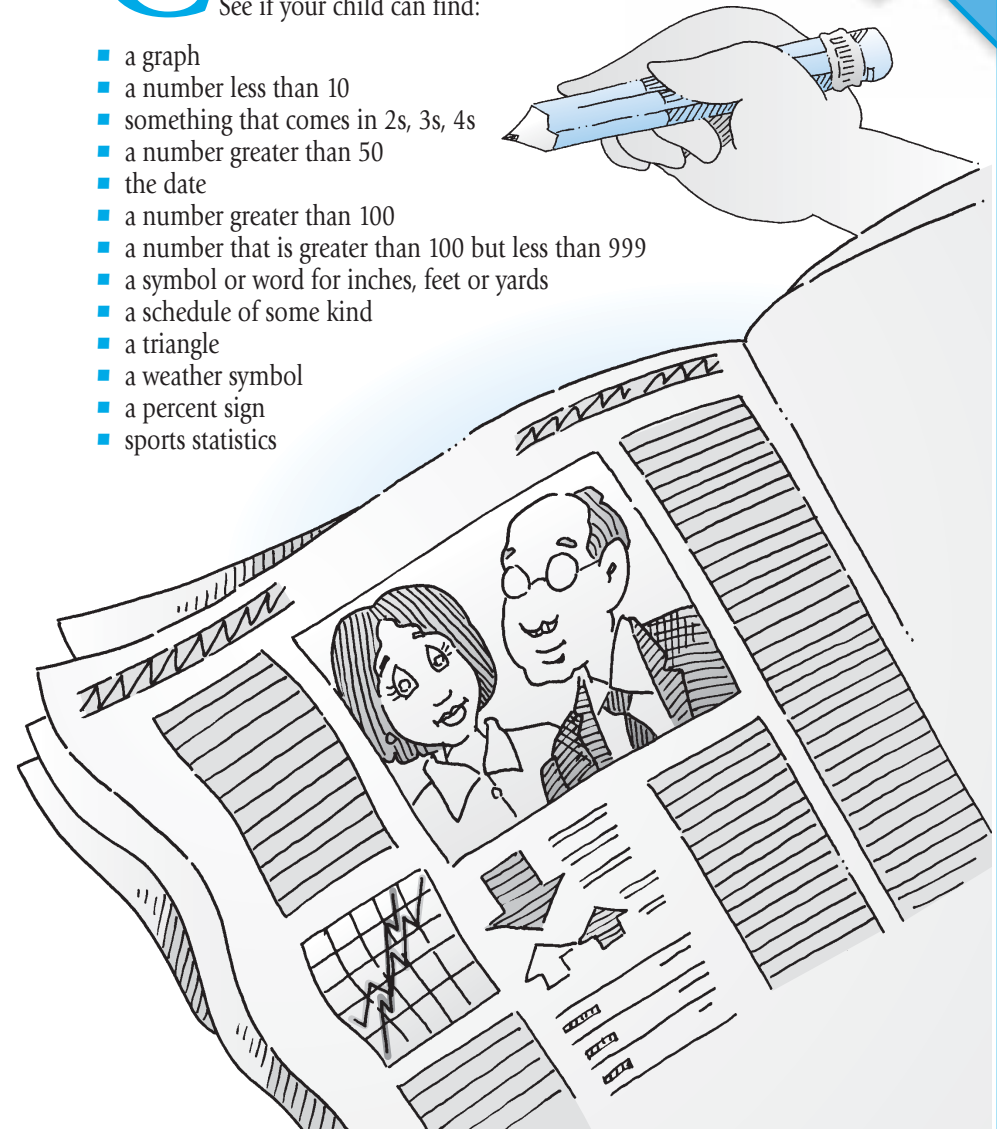
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Use the Newspaper for a Math Scavenger Hunt

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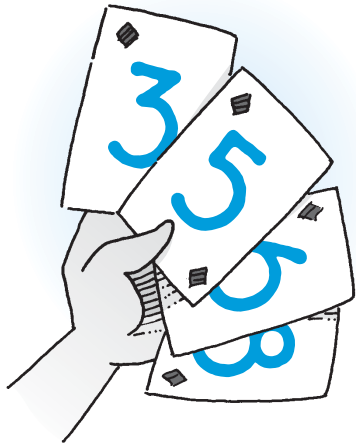
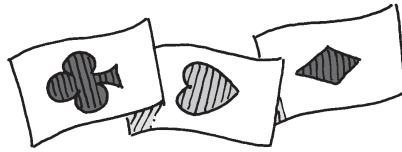
Children in the upper elementary grades will enjoy using the newspaper for a math scavenger hunt. See if your child can find:

- a graph
- a number less than 10
- something that comes in 2s, 3s, 4s
- a number greater than 50
- the date
- a number greater than 100
- a number that is greater than 100 but less than 999
- a symbol or word for inches, feet or yards
- a schedule of some kind
- a triangle
- a weather symbol
- a percent sign
- sports statistics



Card Games Teach Math Skills

Here are two card games to teach math skills:



- For this game, you'll need the cards from 1 to 9 in each suit. Give each player four cards. Have players use addition, subtraction, multiplication and division to see how many math problems they can create in a specific amount of time using those four numbers. Award one point for each answer. Here's how a player might write problems using 3, 5, 6 and 8:

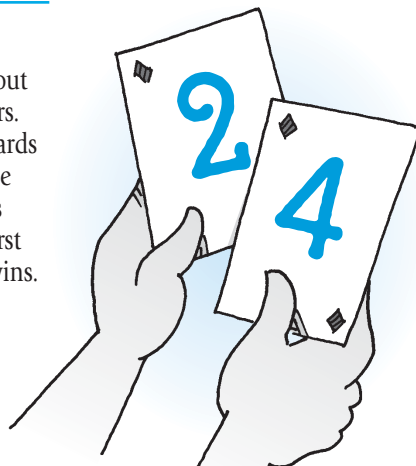
$$3 + 5 + 6 + 8 = 22$$

$$(8 \times 5) - (6 \div 3) = 38$$

$$(5 - 3) + (8 - 6) = 4$$

$$(6 \times 3) + 8 + 5 = 31$$

- For this game, you'll need cards 1 through 10 in all four suits. Deal out half the deck to each of two players. Then have players turn over two cards each. The player who can make the largest fraction from the two cards showing takes all the cards. The first person to collect the entire deck wins.



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Have Fun With Fractions and Decimals

- Number lines can help children understand fractions and decimals.

0 _____ 1

Write a list of fractions— $1/8$, $1/4$, $1/6$, $1/2$, $1/5$, $1/3$, $1/10$, and so on. Have your child put those fractions on the line above in approximately the place where they should go. This will help him get a mental picture of the value of a fraction. Repeat with a wider variety of fractions— $3/10$, $4/5$, $5/8$, $1/2$, $1/3$, and so on. You can do the same with decimals. See who can come up with the largest or smallest five-digit decimal that could go on the line: .99999, for example, or .00001.

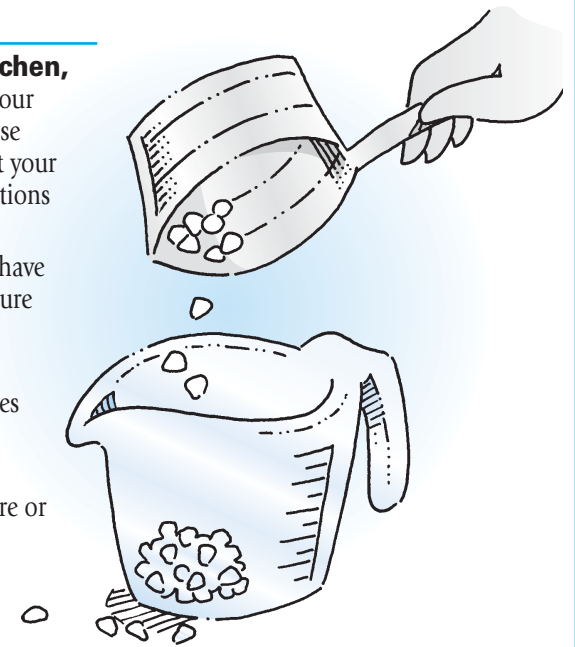
- Use a pizza to help children see fractions.

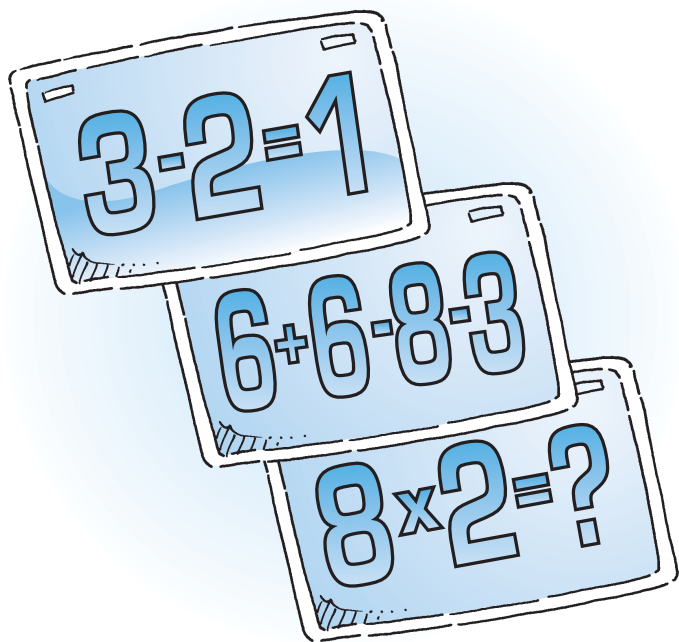
Cut the pizza into halves, quarters and eighths, or into thirds, sixths and twelfths. This way, your child can see clearly that $2/4$ is the same as $1/2$, or that $2/6$ is the same as $1/3$.

- When you're in the kitchen,

use measuring cups to help your child understand fractions. Use rice, popcorn or water and let your child find the answer to questions like these:

- How many times will you have to fill up the $1/4$ cup measure before the cup measure is filled? (4)
- How many $1/4$ cup measures will fill up the $1/2$ cup measure? (2)
- Is $1/3$ cup plus $1/4$ cup more or less than $1/2$ cup? (more)





Use License Plates to Teach Math Skills

When you're in the car, you can use license plates on other cars to teach math skills. Young children can read the numbers. Older children can try to add the numbers quickly in their heads.

As your child gets older, you can try different problems using the numbers on the license plate. For example, if you use the plate number 663M218, ask your child if he can:

- make a 1 using two numbers? $3 - 2 = 1$
- make a 1 using three numbers? $6 - (3 + 2) = 1$
- make a 1 using four numbers? $(6 + 6) - 8 - 3 = 1$
- make a 1 using five numbers? $3 - [(6 + 6) - 8 - 2] = 1$
- make a 1 using six numbers? $8 \times 2 - (6 + 6) - 3 = 1$

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Help Older Students Get Over Math Anxiety

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Some students may be so anxious about math that they can't do their best. Here are some teacher-tested tips on turning math anxiety into math success:

- **Point out** that boys and girls can do equally well in math. The idea that boys are better than girls in math is a cultural myth unique to some countries. In other countries the belief is that girls are naturally *better* than boys in math—and the girls are expected to help the boys learn math.
- **Be positive.** Students who *think* they can do well in math usually *do*. Students know that an "I can do it!" attitude helps in sports and many other areas. Point out that attitude also makes a difference in math.
- **Be prepared.** The way to do well in math is by studying every day. There is no magic to success in music, reading, spelling or any other subject, including math. The key is to study and practice, practice, practice.
- **Use errors as learning opportunities.** If your child gets a problem wrong on a test, have her rework it as soon as possible. Nearly everything can be learned through trial and error. Your child will try something, figure out what she did wrong, try again, do a little better and try again—until she gets it right. That's how she learned to talk, walk, ride a bike, write her name, etc.—and it's true for math, too. We learn through our mistakes.



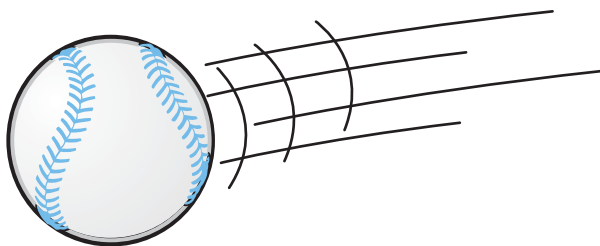
Sports Statistics Can Build an Interest in Math

number of throws caught ÷ number of throws

Many students who have never developed much interest in math start to see its importance when they develop an interest in sports. As you're watching a game with your young sports fan, try to keep your own statistics. For example:

- What percentage of passes did the quarterback complete in the first quarter?
- What percentage of three-point shots did your favorite team make?
- If a baseball player's batting average is .325, how many times on average does he get a hit for every 10 times at bat? How many hits does he get for every 100 times at bat? How many hits for every 1000 times at bat? (3.25 hits per 10; 32.5 hits per 100; 325 hits per 1000)

number of baskets ÷ number of three-point attempts



90 miles per hour x 5,280 feet per mile ÷ 60 minutes per hour ÷ 60 seconds per minute

multiply the number of runs changed (not counting errors) by 9 innings, then divide by the number of innings he pitched

- If a pitcher throws a ball at 90 miles per hour, how many feet does the pitch travel in one second? (132 feet)
- How do you compute a baseball pitcher's Earned Run Average (ERA)? A basketball player's field goal percentage?
- What other averages can you find in a newspaper's sports page and how do you compute them?

number of baskets made ÷ number of field goal shots taken

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When You Need Help

There may come a time when your child needs more help in math than you can offer. Where can you get help?



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- Your child's teacher** may have suggestions. It may be possible for your child to stay after school and use computerized software to practice math skills.
- A volunteer tutor** may be able to help your child. In many middle and secondary schools, honor students are often available as tutors. Adult volunteers may provide extra help to students who need it. Some schools organize networks of parent volunteers—one parent who is good in math helps students in that subject while another parent offers assistance in reading or writing.
- A professional tutor** might also be an option. Again, the teacher may offer some suggestions. While a private tutor can be expensive, some tutoring centers offer scholarships or charge fees on a sliding scale.

By tapping into your child's natural curiosity about the world around her, you can help her develop a fascination with numbers and a positive attitude about learning math in school.

No matter what children do when they grow up, math is sure to be a part of their lives. Helping children with math today helps prepare them for future success.

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