# Family Math

**math, we've got this!**

Everyone can participate in these puzzles, compare notes, and share solutions. ***Enjoy!***

## Palindromes

Palindromes are numbers, words, phrases, and sentences that read the same forward and backward. They are symmetrical, even though their name isn't.

Palindrome numbers are fun to notice on their own.
- Some dates are known as palindrome dates (June 1, 2016 (6/1/16) is one).
- Perhaps your street address or phone number is a palindrome.

There are at least 123,321 ways Mom, Dad, Pop, and Sis can have fun with palindrome numbers. Here are a few:

### Abracadabra! I can turn this number into a palindrome!

Ask a family member for a 4-digit number. If the number is not a palindrome, here's the magic to turning it into one:
- Write the original number. (ex: 3452)
- Write the digits of the number in reverse order. (3452 → 2543)
- Add these two numbers together. (3452 + 2543)
- You may get a palindrome right away, but you might not. (3452 + 2543 = 5995)
- If you did, your magic is done!
- If you didn't, continue reversing the resulting number and finding the sum of the pair of numbers. You will eventually get a palindrome!

Things to figure out as a family:
- What do the numbers that become a palindrome in one step have in common?
- What is the highest number of times you had to reverse and add before a palindrome appeared?
- Try using 5-digit numbers. Does the magic take longer?

### How many more miles to the next palindrome?

During a family trip in the car someone can ask, "How many miles to the next palindrome?" The driver will read the odometer and report the current mileage. Everyone in the car then figures out what the mileage will be the next time the odometer shows a palindrome. There will be some lively discussions if not everyone gets the same answer!

Examples:
- 23815 miles → next palindrome = 23832 miles
- 104601 miles → next palindrome = 105501 miles