Name: _____
Grade: _____
Teacher: _____

There will be 16 math challenges throughout 2011-2012 school year. Every two weeks, there will be a math challenge. It will be published in our school newsletter and on the Math in Action's website (www.mathinaction.org). Students from grade 1 to grade 6 are invited to participate. **Those who complete at least 12 out of the 16 challenges will be honored at the award assembly in June 2012.**

This is our first Math Challenge, and I would like to invite all of you to solve the following math problems involving Palindrome. Parents, please take this opportunity to talk about math with your child. Enjoy it and don't forget to turn your answers in by **Thursday (no later than 3PM), October 6, 2011. There will be 8 Jacob Ladders to give away. Winners are randomly selected from qualified submissions and will be announced on Monday.** Kids and parents, try to solve as many riddles as you can. Good luck!

PALINDROME NUMBERS

A palindrome is a word, phrase, verse, sentence, or number that reads the same backward and forward. The words "pop" and "level" are palindromes. A palindromic number is a number that is the same when written backward and forward. Numbers 272 and 2002 are palindromic numbers.
First & Second Grade: Solve at least 3 riddles/problems.
Third & Fourth Grade: Solve at least 6 riddles/problems.
Fifth & Sixth Grade: Solve at least 9 riddles/problems.

Palindrome Riddles/Problems

1. I am the largest two digit number and I am a palindrome. What number am I?

Answer: _____

2. I am a palindrome. I am >11 (greater than eleven) and <50 (less than fifty). I am an odd number. What am I?

Answer: _____

3. I am a three digit number and I am a palindrome. I am less than 500. I am greater than 200. All my digits are odd. If you take each of my three digits and add them together, they equal 7. What number am I?

Answer: _____

4. I am a four digit number. I have a one in my thousands place, and a two in my hundreds place. I am a palindrome. What number am I?

Answer: _____

5. I am also a palindrome. I am greater than the number of days in a year and less than the product of 19 and 20. What number am I?

Answer: _____

6. I'm a seven digit number, and I am a palindrome. Five of my digits are zeros. I am the greatest number possible with those characteristics. What number am I?

Answer: _____

7. The odometer of a car read 15851 when the driver noticed that the number was palindromic. "Interesting" said the driver to herself. "It will be a long time before it happens again." However, two hours later, the odometer showed a new palindromic number. What was the new palindrome number in the car's odometer after traveling for two hours?

Answer: _____

8. Another car's odometer shows 72927 miles, a palindromic number. What is the minimum number of miles you would need to travel to form another?

Answer: _____

9. Two digit palindromes must have identical digits (11, 22, 33,…). You have 9 choices for the first digit, and the second digit is determined for each, so you have 9 palindromes between numbers 10-100. How many palindromic numbers are there between 100-1000?
Hint: one way to approach this problem is to make a list and look for a pattern.

Answer: _____

10. What is the largest palindrome made from the product of two 2-digit numbers? The two digit numbers don't need to be palindromes.
Hint: a) think about whether you should use small 2-digit numbers or large 2-digit numbers?
b) use a calculator to do 'guess and check' strategy.

Answer: _____

Extension

Now that you know what a palindrome is all about, try this activity:
By definition, all numbers that have the same digits such as 44, 11, 55, 222, and 6666 are palindromic numbers. Given any numbers, you can use the following simple steps to find other palindromic numbers:
Step 1:
Start with any number. Call it the **original number**. Reverse the digits of the original number.
Step 2:
Call the number whose digits are reversed **new number**. Add the new number to your original number. Call the number found by adding the new number to the original number the **test number.**
Step 3:
If test number is a palindrome, you are done. If not, use your test number as your original number and repeat the steps above.
Sound complicated? Not really! Check out these examples:

Example #1:
Original number = 41
Reverse the original number = 14
Add the two numbers = 41 + 14 = 55
The number 55 is a palindrome.

Some figures require more steps.
Example #2:
Original number = 68.
68 + 86 = 154. Since 154 is not a palindrome. Repeat this step until you have a palindrome. 154+451 = 605; then 605+506 = 1111.

Now, here is your super mind bender puzzle: find 3 numbers less than 100 that require at least 4 additions to obtain palindromes.

*Math Challenge 2 will be available on **October 14** at www.mathinaction.org and in our school's newsletter on **October 17, 2011.***