METHODS

1. Twin primes are a pair of prime numbers that differ by 2. For example, 3 and 5 are twin primes, 5 and 7 are twin primes, and 11 and 13 are twin primes. Write a program to find all twin primes less than 1,200. Display the output as follows:
   (3, 5)
   (5, 7)

2. Write a class that contains the following two methods:
   public static double poundToKilogram(**double** pound)
   /** Convert from kilograms to pounds */
   public static double kilogramToPound(**double** kilogram)
   The formula for the conversion is:
   pound = 0.453 * kilogram
   kilogram = 2.204 * pound

   Write a test program that invokes these methods to display the following tables:

Kilograms	Pounds		Pounds	Kilograms
1	2.2	|	20	9.09
3	6.6	|	25	11.36
...				
197	433.4	|	510	231.82
199	437.8	|	515	234.09

3. Some websites impose certain rules for passwords. Write a method that checks whether a

string is a valid password. Suppose the password rules are as follows:

- ■A password must have at least ten characters.
- ■A password consists of only letters and digits.
- ■A password must contain at least three digits.

Write a program that prompts the user to enter a password and displays **Valid Password** if the rules are followed or **Invalid Password** otherwise.

4. An emirp (prime spelled backward) is a nonpalindromic prime number whose reversal is also a prime. For example, 17 is a prime and 71 is a prime, so 17 and 71 are emirps. Write a program that displays the first 120 emirps. Display 10 numbers per line, separated by exactly one space, as follows:

```
13 17 31 37 71 73 79 97 107 113
149 157 167 179 199 311 337 347 359 389
...
```

5. Write a method with the following header to format the integer with the specified width.

public static String format(int number, int width)

The method returns a string for the number with one or more prefix 0s. The size of the string is the width. For example, format(34, 4) returns 0034 and format(34, 5) returns 00034. If the number is longer than the width, the method returns the string representation for the number. For example, format(34, 1) returns 34. Write a test program that prompts the user to enter a number and its width, and displays a string returned by invoking format(number, width).

SPOT

Write a method that computes future investment value at a given interest rate for a specified number of years. The future investment is determined using the formula

$$futureInvestmentValue = investmentAmount \times (1 + monthlyInterestRate)^{numberOfYears*12}$$

Use the following method header:
public static double futureInvestmentValue(double investmentAmount, double monthlyInterestRate,int years)

For example, futureInvestmentValue(10000, 0.05/12, 5) returns 12833.59.

Write a test program that prompts the user to enter the investment amount (e.g.,1,000) and the interest rate (e.g., 9%) and prints a table that displays future value for the years from 1 to 30, as shown below:

```
The amount invested: 1000 Enter
Annual interest rate: 9 Enter
Years     Future Value
1            1093.80
2            1196.41
...
29          13467.25
30          14730.57
```