AP Computer Science Name _____
Simple Algorithms Lab

Goal: explore various algorithms for solving problems using the primitive data types in Java

(a) Use only three *primitive types*: int, double, boolean, and learn about the Scanner class.

(b) Do not use any methods in the Math class.

(c) Verify your work with a menu-driven program that loops until the user elects to quit.

1. Write a method factors(int num) that will print all the factors of a given positive integer. For example, factors(30) should produce the following formatted output (note that a period terminates the list):

   The factors of 30 are: 1, 2, 3, 5, 6, 10, 15, 30.

2. Write a method GCD(int a, int b) that returns the greatest common divisor of its two positive integer parameters.

3. Write a boolean method prime(int num) that determines whether a given integer greater than one is a prime number. Use this header: boolean prime(int num)

4. Write a method double power (double base, int exponent) that raises a given number (real or integer) to a given (positive, negative, or zero) integer power. Do NOT use pow(x) or log(x) in your solution. Note that if the base is zero, the exponent must be positive.

5. Write a method findDigit (int num, int n) that returns the n^{th} digit from the right of a given integer where n is a positive integer. For example,

   findDigit (30568,2) will return 6
   findDigit(234,5) will return 0
   findDigit(-4532,3) will return 5

6. Write a method downDigits(int num) that will list the digits of a positive integer in one column. For Example:

   downDigits (560) will produce the output at right

The digits of 560 are:
5
6
0

7. Write a method countDigits (double num) that returns the number of digits to the left of the decimal point of a valid decimal point number. Note that countDigits (0.74) returns 1.

Before any coding happens you must write on paper or type a google doc and submit to me the order which you plan to write the above methods in and why.