# Homework: Math for Developers

This document defines homework assignments from the [“C# Basics“ Course @ Software University](http://softuni.bg/courses/csharp-basics/). Please submit as homework a single txt/doc/docx file holding the answers of all below described problems.

## Some Primes

Find the 24th, 101st and 251st prime number.

**Answer:**

24th -> 89

101st -> 547

251st -> 1597

Source: http://www.mathsisfun.com/numbers/prime-numbers-to-10k.html

## Some Fibonacci Primes

Check if the 24th, 101st and 251st prime numbers are part of the base Fibonacci number set. What is their position?

**Answer:**

89 yes -> 11th

547 no

1597 yes-> 17th

Source: http://www.mathsisfun.com/numbers/fibonacci-sequence.html

## Some Factorials

Find 100!, 171! and 250! Give all digits.

**Answer:**

100! = 93326215443944152681699238856266700490715968264381621468592963895217599993229915608941463976156518286253697920827223758251185210916864000000000000000000000000

171! = 1241018070217667823424840524103103992616605577501693185388951803611996075221691752992751978120487585576464959501670387052809889858690710767331242032218484364310473577889968548278290754541561964852153468318044293239598173696899657235903947616152278558180061176365108428800000000000000000000000000000000000000000

250! = 232856260909107732320814552024368470994843717673780666747942427112823747555111209488817915371028199450928507353189432926730931712808990822791030279071281921676527240189264733218041186261006832925365133678939089569935713530175040513178760077247933065402339006164825552248819436572586057399222641254832982204849137721776650641276858807153128978777672951913990844377478702589172973255150283241787320658188482062478582659808848825548800000000000000000000000000000000000000000000000000000000000000

Source: http://www.mathsisfun.com/calculator-precision.html

## Calculate Hypotenuse

You are given three right angled triangles. Find the length of their hypotenuses.

1. Catheti: 3 and 4

Using Pythagoras' Theorem: a^2 + b^2 = c^2

**Answer:** hypotenuse = 3\*3 + 4\*4 = 9 + 16 = 25; c = square root of 25 = **5**

1. Catheti: 10 and 12

**Answer:** hypotenuse = 10\*10 + 12\*12 = 100 + 144 =244

c = square root of 244 = **15.6**

1. Catheti 100 and 250

**Answer:** hypotenuse = 100\*100 + 250\*250 = 10000 + 62500 = 72500

c = square root of 72500 = **269.3**

## Numeral System Conversions

Convert 1234d to binary and hexadecimal numeral systems.

From decimal to binary:

Algorithm:

Number % 2

Number / 2

Result: 01001011001

(now we need to reverse the above as the last digits of the binary number have been extracted first)

Reversed final result: 1234d = **10011010010b**

Now from decimal to hexadecimal:

Algorithm:

Number % 16

Number / 16

Result: 2D4

(now we need to reverse the above as the last digits of the hexadecimal number have been extracted first)

Reversed final result: 1234d = **4D2hex**

Convert 1100101b to decimal and hexadecimal numeral systems.

**Answer:**

To decimal: 2^0 + 0 + 2^2 + 0 + 0 + 2^5 + 2^6 = 1 + 4 + 32 + 64 = **101**

Now from decimal to hexadecimal:

Algorithm:

Number % 16

Number / 16

Result: 56

(now we need to reverse the above as the last digits of the hexadecimal number have been extracted first)

Reversed final result: 1100101b = 101d = **65hex**

Convert ABChex to decimal and binary numeral systems.

**Answer:**

C = 12;

B = 11;

A = 10;

ABChex = A \* 16^2 + B \* 16^1 + C \* 16^0 = 10 \* 16^2 + 11 \* 16^1 + 12 \* 16^0 = **2748d**

Now from decimal to binary:

Algorithm:

Number % 2

Number / 2

Result: 001111010101

(now we need to reverse the above as the last digits of the binary number have been extracted first)

Reversed final result: ABChex = 2748d = **101010111100b**

## Least Common Multiple

Find LCM(1234, 3456).

**Answer:**

The LCM of 1234 and 3456 is **2132352**

Source: http://www.mathsisfun.com/least-common-multiple.html