# 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.

* 24th = 89
* 101st = 547
* 251st = 1597

## Some Fibonacci Primes

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

89 = Number 11 in Fibonacci’s number set.  
547 = No  
1597 = Number 17 in Fibonacci’s number set

## Some Factorials

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

* 100! = 9.332621544 E+ 157 = 93326215443944152681699238856266700490715968264381621468592963895217599993229915608941463976156518286253697920827223758251185210916864000000000000000000000000
* 171! = 1.24101807 E+309 = 1241018070217667823424840524103103992616605577501693185388951803611996075221691752992751978120487585576464959501670387052809889858690710767331242032218484364310473577889968548278290754541561964852153468318044293239598173696899657235903947616152278558180061176365108428800000000000000000000000000000000000000000
* 250! = 3.23285626 E+492 = 3232856260909107732320814552024368470994843717673780666747942427112823747555111209488817915371028199450928507353189432926730931712808990822791030279071281921676527240189264733218041186261006832925365133678939089569935713530175040513178760077247933065402339006164825552248819436572586057399222641254832982204849137721776650641276858807153128978777672951913990844377478702589172973255150283241787320658188482062478582659808848825548800000000000000000000000000000000000000000000000000000000000000

## Calculate Hypotenuse

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

Питагорова теорема за намиране на хипотенузата: c=

1. Catheti: 3 and 4

C=

C =

C =

C = 5 cm

1. Catheti: 10 and 12

C =

C =

C =

C = 15,62 cm

1. Catheti 100 and 250

C =   
C =   
C =   
c = 269,25 cm

## Numeral System Conversions

Convert 1234d to binary and hexadecimal numeral systems.

1. **Decimal to binary**

1234d : 2 = 617 (0)  
617/2 =308 (1)  
308/2 = 154 (0)  
154/2 = (77) (0)  
77/2 = 38 (1)  
38/2 = 19 (0)  
19/2 = 9 (1)  
9/2 = 4 (1)  
4/2 = 2 (0)  
2/2 = 1 (0)  
1 / 2 = 0 (1)

**1234d = 100 110 100 10 b**

1. **Decimal to Hex**

**Делим на 16 или ако е по-голямо число, на 16 на втора степен (256). Пишем остатъка, който всъщност е нашето HEX число, след което умножаваме остатъка по делителя и полученото изваждаме от числото.**

1234d : 256 = **4**  
4 x 256 = 1024  
1024 – 1234 = 210

210 : 16 = **13**13 x 16 = 208  
210 – 208 = **2**

**13 = D**

**1234d = 4D2**

Convert 1100101b to decimal and hexadecimal numeral systems.

**Binary to decimal**

**110 01 01b** = 1x 26 + 1x 25 + 0x24 + 0x 23 + 1x22 +0x21+ 1x 20 =  
= 64 + 32 + 0 + 0 + 4+0+1 = **101 decimal**

**Decimal to Hexadecimal**

**101 d** : 16 = **6**  
6 x 16 = 96  
101 – 96 = **5**

**101 d = 65 hex**

Convert ABChex to decimal and binary numeral systems.

**Hexadecimal to decimal**

**ABC -   
A= 10  
B= 11  
C = 12**

**= 10 x 162+ 11x 161 + 12x 160=**

**= 2 560 + 176 + 12 =**

**= 2 748 decimal**

**Decimal to binary**

2 748 d : 2 = 1374 (0)  
1374 :2= 687 (0)  
687:2= 343 (1)  
343:2 = 171 (1)  
171:2=85 (1)  
85:2 = 42 (1)  
42:2 = 21 (0)  
21:2= 10 (1)  
10:2= 5 (0)  
5:2 = 2 (1)  
2:2=1 (0)  
1:2= 0 (1)

**2748 decimal = 101 010 111 100 binary**

## Least Common Multiple

Find LCM(1234, 3456).

* За да намерим LCM, първо трябва да намерим **Greatest Common Divisor,** който за 1234 и 3456 е **2.**
* Умножаваме 1234 и 3456 и получаваме **4 264 704.**
* Делим **4 264 704** на **2** и получаваме **2 132 352.**

**Най- малко общо кратно на 1234 и 3456 е 2 132 352.**