

Maths 1261 Answers to Quiz 2 Friday 18/10/13 *(it is ok to collaborate)*

(1: 12 marks) Simulate the following statements.

```
printf("%f\n", 1.0 + (2-3.0)/4 - 5 - 6);
printf("%f\n", (1.0 + 2) - 3.0/4 - (5 - 6));
printf("%f\n", 1.0/3/2);
printf("%f\n", 1.0/(3/2));
```

Answers

-10.250000
3.250000
0.166667
1.000000

(2: 12 marks). Follow every step of the code below and show what gets printed.

```
#include <stdio.h>
main()
{
    int m, y;
    for ( m=6; m <= 7; ++m )
    {
        y = m * m;
        y *= y;
        y *= m;
        y -= m;
        y %= 5;
        printf("m is %d, y is %d\n", m, y);
    }
}
```

m	y	m<=7?
6		6<=7
	36	
	1296	
	7956	
	7950	
	0	

prints:
m is 6, y is 0

7<=7

49
2401
16807
16800
0

prints:
m is 7, y is 0
8

8<=7? No. Stop.

(3: 12 marks) Compute the single-precision floating point representation, little endian, in hexadecimal, of

544.0/11

Sign 0
544.0/11 --> 32 * 17/11
32: true exponent 5, biased...

01111111
+ 101

10000100

mantissa

1 6/11 ((1 1/11 0 2/11 0 4/11 0 8/11 1 5/11 0 10/11
1 9/11 1 7/11 1 3/11 0 6/11))

1 (1 0 0 0 1 0 1 1 1 0) recurring
1.1000101110 recurring, discard the 1
This can be checked: 1 + 558/1023

24 bits

1 0 0 0 1 0 1 1 1 0 1 0 0 0 1 0 1 1 1 0 1 0 0 0

24th bit is zero; round down.

1 0 0 0 1 0 1 1 1 0 1 0 0 0 1 0 1 1 1 0 1 0 0

Putting all together

0 10000100 10001011101000101110100
1100 0010 0100 0101 1101 0001 0111 0100
4 2 4 5 d 1 7 4
Little endian 74 d1 45 42

(4: 14 marks) Compute the double-precision floating point representation, little endian, in hexadecimal, of

-17.0/352

Answer

- (17/11) * 2^{-5}

double precision 1 + 11 + 52

sign 1

exponent -5 biased 011 1111 1111

- 101

011 1111 1010

mantissa from above

1 0 0 0 1 0 1 1 1 0 1 0 0 0 1 0 1 1 1 0 1 0 0 0

1 0 0 0 1 0 1 1 1 0 1 0 0 0 1 0 1 1 1 0 1 0 0 0 1 0 1 1 1 0

1 0 0 0 1 0 1 1 1 0 1 0 0 0 1 0 1 1 1 0 1 0 | 0 0

round down

1 0 0 0 1 0 1 1 1 0 1 0 0 0 1 0 1 1 1 0 1 0 0 0 1 0 1 1 1 0

1 0 0 0 1 0 1 1 1 0 1 0 0 0 1 0 1 1 1 0 1 0

All together

1 011 1111 1010

1000101110100010111010001011101000101110100010111010

1 011 1111 1010 1000 1011 1010 0010 1110

b f a 8 b a 2 e

1000 1011 1010 0010 1110 1000 1011 1010

8 b a 2 e 8 b a

Little endian

ba e8 a2 8b 2e ba a8 bf