1、 已知某 32 位整数 X，其值为-101（十进制），则其 16 进制补码为_____，另一 32 位整数 Y 的补码为 0xFFFFFF6B，则 X+Y 的 16 进制补码(32 位)为_____，X-Y 的 16 进制补码为_____。

2、 给定一个浮点格式，k 位指数和 n 位小数，对于下列数给出其阶码 E、尾数 M、小数 f 和值 V 的公式。并请描述其位表示。

（1）5.0

（2）能够被准确描述的最大奇整数；

（3）最小的正规格化数。

3、We are running programs on a machine with the following characteristics:

- Values of type int are 32 bits. They are represented in two's complement, and they are right shifted arithmetically. Values of type unsigned are 32 bits.
- Values of type float are represented using the 32-bit IEEE floating point format, while values of type double use the 64-bit IEEE floating point format.

We generate arbitrary values x, y, and z, and convert them to other forms as follows:

```
/* Create some arbitrary values */
int x = random();
int y = random();
int z = random();
/* Convert to other forms */
unsigned ux = (unsigned) x;
unsigned uy = (unsigned) y;
double dx = (double) x;
double dy = (double) y;
double dz = (double) z;
```

For each of the following C expressions, you are to indicate whether or not the expression always yields 1.

Expression	Always True?
`(x<y) == (-x>-y)`	Y N
`((x+y)<<4) + y-x == 17*y+15*x`	Y N
`~x+~y+1 == ~(x+y)`	Y N
`ux-uy == -(y-x)`	Y N
`(x >= 0) || (x < ux)`	Y N
`((x >> 1) << 1) <= x`	Y N
`(double)(float) x == (double) x`	Y N
`dx + dy == (double) (y+x)`	Y N
`dx + dy + dz == dz + dy + dx`	Y N
`dx * dy * dz == dz * dy * dx`	Y N

4、 In the following questions assume the variables a and b are signed integers and that the machine uses two's complement representation. Also assume that MAX_INT is the maximum integer, MIN_INT is the minimum integer, and W is one less than the word length (e.g., W = 31

for 32-bit integers). Match each of the descriptions on the left with a line of code on the right (write in the letter).

1. One's complement of a

_____

2. a.

_____

3. a & b.

_____

4. a * 7.

_____

5. a / 4 .

_____

6. (a < 0) ? 1 : -1 .

_____

a. `~(~a | (b ^ (MIN_INT + MAX_INT)))`

b. `((a ^ b) & ~b) | (~(a ^ b) & b)`

c. `1 + (a << 3) + ~a`

d. `(a << 4) + (a << 2) + (a << 1)`

e. `((a < 0) ? (a + 3) : a) >> 2`

f. `a ^ (MIN_INT + MAX_INT)`

g. `~((a | (~a + 1)) >> W) & 1`

h. `~((a >> W) << 1)`

i. `a >> 2`

5、 Match each of the assembler routines on the left with the equivalent C function on the right.

```
foo1:
     pushl %ebp
     movl %esp,%ebp
     movl 8(%ebp),%eax
     sall $4,%eax
     subl 8(%ebp),%eax
     movl %ebp,%esp
     popl %ebp
     ret

foo2:
     pushl %ebp
     movl %esp,%ebp
     movl 8(%ebp),%eax
     testl %eax,%eax
     jge .L4
     addl $15,%eax
.L4:
     sarl $4,%eax
     movl %ebp,%esp
     popl %ebp
     ret

foo3:
     pushl %ebp
     movl %esp,%ebp
     movl 8(%ebp),%eax
     shrl $31,%eax
     movl %ebp,%esp
     popl %ebp
     ret
```

```
int choice1(int x)
{
    return (x < 0);
}

int choice2(int x)
{
    return (x << 31) & 1;
}

int choice3(int x)
{
    return 15 * x;
}

int choice4(int x)
{
    return (x + 15) /4
}

int choice5(int x)
{
    return x / 16;
}

int choice6(int x)
{
    return (x >> 31);
}
```