1 Give Float (32-bit) rep of the following:

Put final answers in hex form

(a) $14.125 = 1110.001$ } Fixed point notation not floating point yet

INT: 14

$14/2 = 7.0$ r 0

$7/2 = 3.5$ r 1

$3/2 = 1.5$ r 1

$1/2 = 0.5$ r 1

DEC: 0.125

$0.125 \times 2 = 0.25$ w 0

$0.25 \times 2 = 0.5$ w 0

$0.5 \times 2 = 1.0$ w 1

1110.001

3

$= 1.110001 \times 2^{3}$

Exp $= 127 + 3 = 130 =$ 10000010

Man $=$ 110001

Sign $= 0$

(positive #)

23 bits

Sign | Exp | Man

$14.125 =$ 01000001011000100000000000000000

4 1 6 2 0 0 0 0

$=$ 0X41620000

(2) $-7.53125 = 111.10001_2$

INT: 7

$7/2 = 3.5$ r1

$3/2 = 1.5$ r1

$1/2 = 0.5$ r1

DEC: 0.53125

0.53125 x2 = 1.0625 w1

0.0625 x2 = 0.125 w0

0.125 x2 = 0.25 w0

0.25 x2 = 0.5 w0

0.5 x2 = 1.0 w1

111 . 10001

2

$$1.1110001 \times 10^{2}$$

Exp = 2 + 127 = 129 = 10000001

Man = 1110001

Sign = 1

Sign	Exp	Man
1	10000001	11100010000000000000000

-7.53125 = 11000000111100010000000000000000

12	0	15	1	0	0	0	0
C		F					

= 0XC0F10000

(C)

8675.309 =

10000111000011.010011111000110

INT | 8675

8675 /2	4337.5	r1
4337/2	2168.5	r1
2168 / 2	1084.0	r0
1084/2	542 .0	r0
542/2	271.0	r0
271/2	135.5	r1
135/2	67.5	r1
67/2	33.5	r1
33/2	16.5	r1
16/2	8.0	r0
8.0/2	4.0	r0
4.0/2	2.0	r0
	1.0	r0

2.072

1/2 → 0.5 → r1

DEC → .309

.309 x2	0.618	w0
0.618 x2	1.236	w1
.236 x2	0.472	w0
.472 x2	0.944	w0
0.944 x2	1.888	w1
0.888 x2	1.776	w1
0.776 x2	1.552	w1
0.552 x2	1.104	w1
0.104 x2	0.208	w0
0.208 x2	0.416	w0

0.416 x 2	0.832	w0
0.832 x 2	1.664	w1
0.664 x 2	1.328	w1
0.328 x 2	0.656	w0
0.656 x 2	1.312	w1
0.312 x 2	0.624	w0

1.0000 1111 0001 1. 0100 1111 0001 1101

13

1.0000 1111 0001 1010 0111 1000 1101 $\times 10^{13}$

Exp : 127 + 13 = 140 = 1000 1100

MAN : 0000 1111 0001 1010 0111 1000

SIGN : 0

Sign exp man

0 10001100 00001111000110100111100

0 10001100 00001111000 11010011100

↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

4 6 0 7 8 13 3 12

= **0x46078D3C**

2

ⓐ 00111111100000100000000000000000000

Sign = 0

Exp = 01111110 = 126 - 127 = -1

Man = 00001

$$(-1)^0 \times (1.00001) \times 2^{-1}$$

$$= (-1)^0 \times (1.03125) \times 2^{-1}$$

$$= \boxed{0.515625}$$

(B) 01 0000 101 1011 1111 0000 0000 0000 0000 0000

Sign = 0

Exp = 10000101 - 127 = 133 - 127 = 6

Man = 101 1111

$$(1)^0 \times (1.101111) \times 2^{+6}$$

$$= (1)^0 \times (1.7343) \times 2^{+6}$$

$$= \boxed{110.99}$$

(C) 1100 0010 1111 1010 0100 0000 0000 0000 0000

Sign = 1

Exp = 10000101 - 127 = 6

Mn = 11101001

$= (-1)^1 \times (1.\ 953125) \times 2^6$

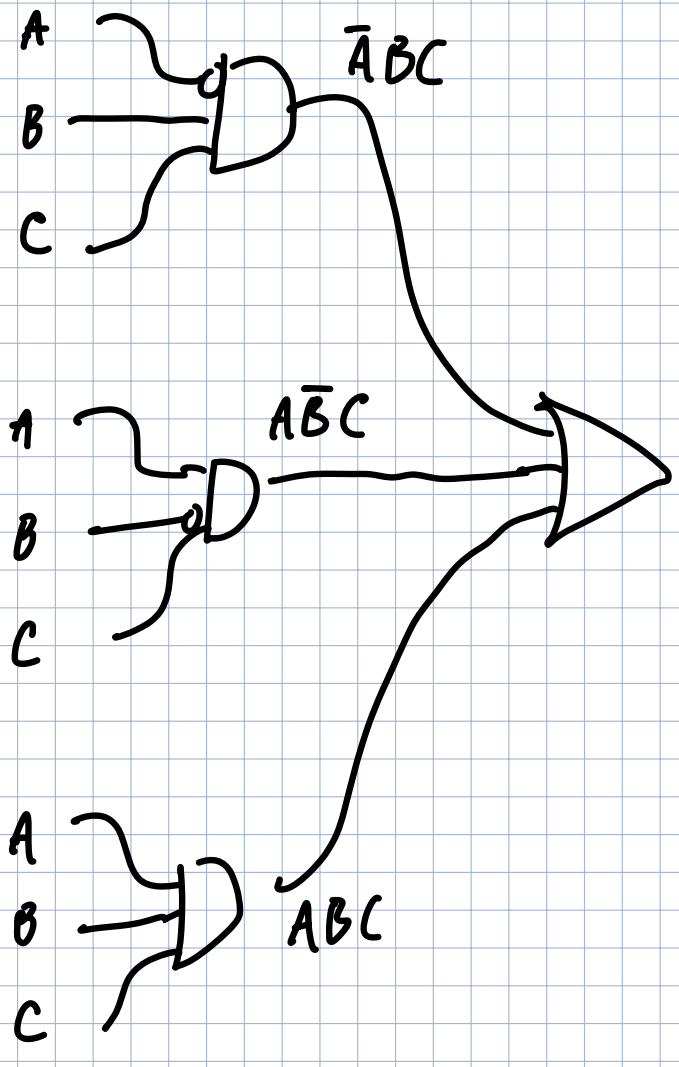
$= \boxed{-125}$

3

Eq: Sum of Products Form

input			output
A	B	C	X
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1

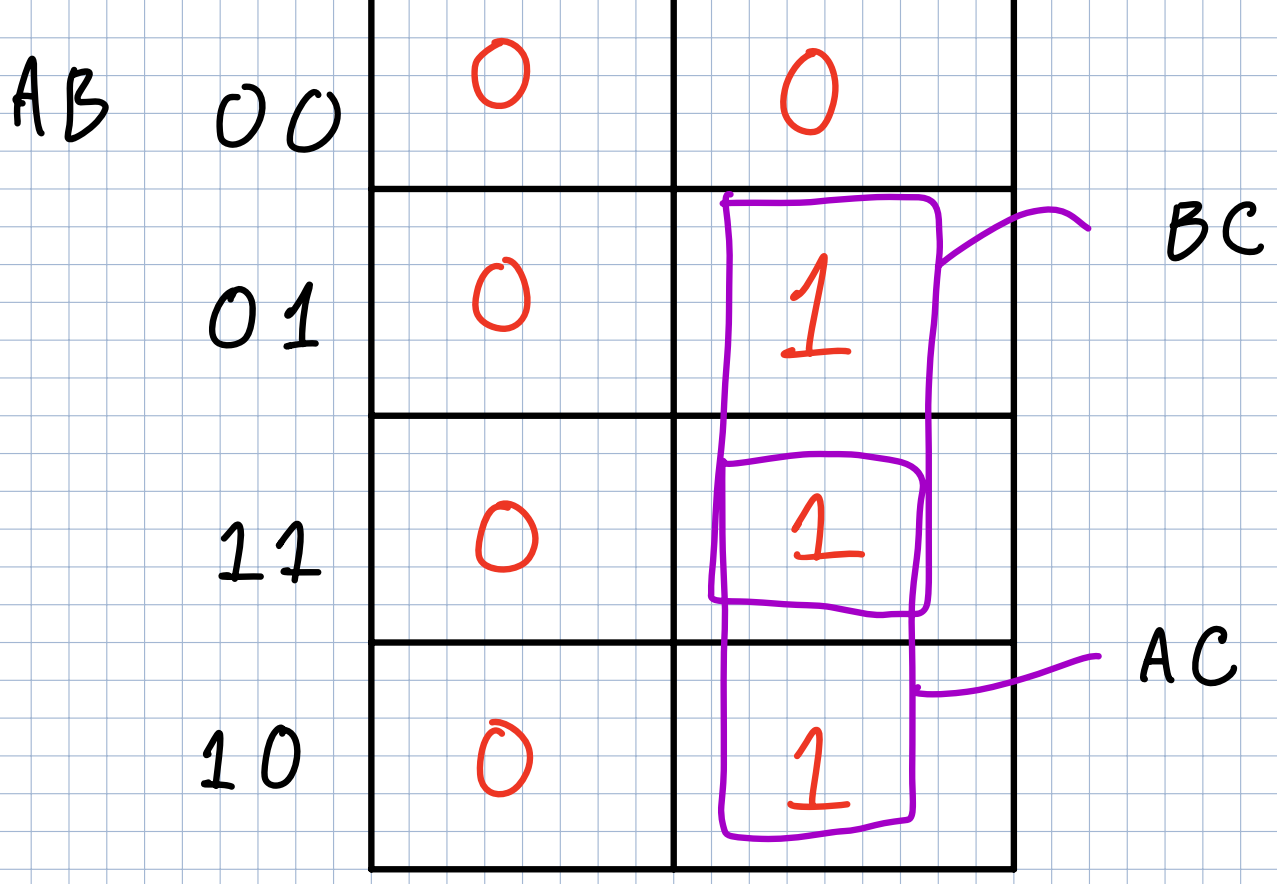
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	1



$$f(A,B,C) = \bar{A}BC + A\bar{B}C + ABC$$

C

0	1



$$f(A,B,C) = BC + AC$$

4

A	B	C	D	X
0	0	0	0	0
0	0	0	1	1

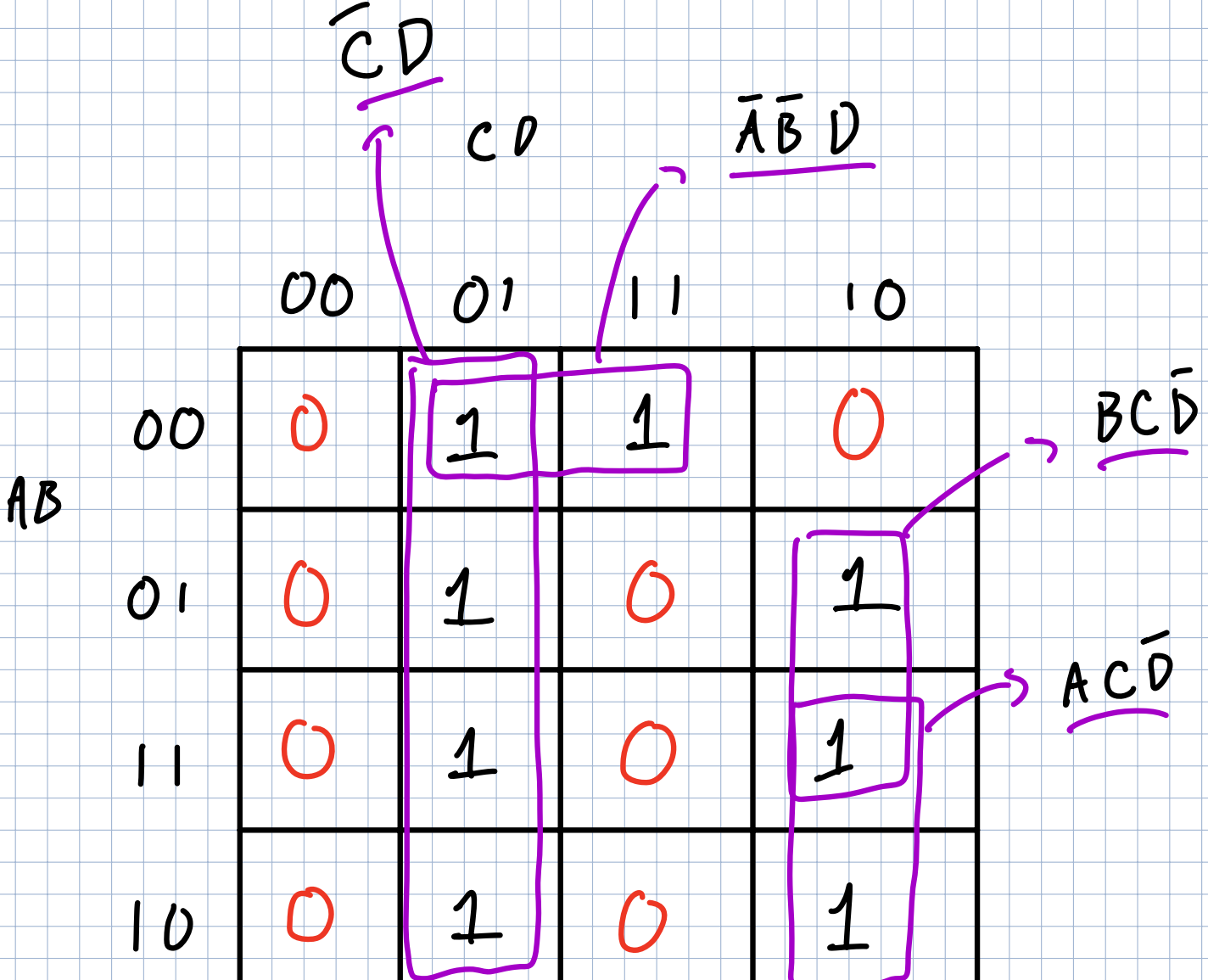
$\bar{A}\bar{B}\bar{C}D$

0	0	1	0	0	+
0	0	1	1	1	$\bar{A}\bar{B}CD$
0	1	0	0	0	+
0	1	0	1	1	$\bar{A}B\bar{C}D$
					+
0	1	1	0	1	$\bar{A}BC\bar{D}$
0	1	1	1	0	+
1	0	0	0	0	
1	0	0	1	1	$A\bar{B}\bar{C}D$
					+
1	0	1	0	1	$A\bar{B}C\bar{D}$
1	0	1	1	0	+
1	1	0	0	0	
1	1	0	1	1	$AB\bar{C}D$
					+
1	1	1	0	1	$ABC\bar{D}$

1	1	1	1	0

$$f(A,B,C,D) = \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}CD + \bar{A}B\bar{C}D + \bar{A}BC\bar{D} +$$

$$A\bar{B}\bar{C}D + A\bar{B}C\bar{D} + AB\bar{C}D + ABC\bar{D}$$



$\bar{C}\,D$

$$f(A,B,C,D) = \bar{C}\,D + \bar{A}\bar{B}D + BC\bar{D} + AC\bar{D}$$