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1) $A = 1011010_2$ and $B = 0101111_2$

A+B

```
  1011010
  0101111
---------
(1)0001001₂
```

A−B

2nd complement of B = 1010000
+1
1010001_2

```
  1011010
  1010001
---------
(1)0101011₂
```

2) 174.25_{10}

```
174 | 2
  0   87 | 2
       1   43 | 2
            1   21 | 2
                 1   10 | 2
                      0    5 | 2
                           1    2 | 2
                                0    1 | 2
```

$174_{10} = 10101110_2$

0.25_{10}

$2^2 = 4 \times 0.25 = 1$

```
1 | 2
0 | 1
```

$0.25_{10} = 0.01_2$

$174.25_{10} = 010101110.010$

~~Ans~~ 256.2_8

$174.25_{10} = 010101110.0100$

$174.25_{10} = AE.4_{16}$

3) Full adder is a combinational circuit that is used to add two, single-bit numbers and previous carry.

X	Y	C	S
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

X and Y are single bit numbers and C is the carry / S is sum

$SOP = X'Y'C + X'YC' + XY'C' + XYC$

~~After~~ After minimization:

$Sum = XY + YC + XC$

∴ The sum is equivalent to the three ~~Radian~~ variable XOR function.

4)

A	B	C	Q
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	0

SOP = $\bar{A}\cdot\bar{B}\cdot C + A\cdot\bar{B}\cdot\bar{C} + A\cdot\bar{B}\cdot C$

POS = $(A+B+\bar{C})\,(\bar{A}+B+C)\,(\bar{A}+B+\bar{C})$

5) $f(a,b,c,d) = \Sigma m(1,3,6,7) + d(4,9,11)$

cd \ ab	00	01	11	10
00	0 (0)	X (4)	0 (12)	0 (8)
01	1 (1)	0 (5)	0 (13)	X (9)
11	1 (3)	1 (7)	0 (15)	X (11)
10	0 (2)	1 (6)	0 (14)	0 (10)

SOP = $\bar{b}d + \bar{a}bc$

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

$\Pi M = (0,2,3,4)$

CD \ AB	00	01	11	10
00	0 (0)	0 (4)	(12)	(8)
01	(1)	(5)	(13)	(9)
11	0 (3)	(7)	(15)	(11)
10	0 (2)	(6)	(14)	(10)