



NAME: \_\_\_\_\_

NOTE1: OPEN NOTES, OPEN BOOK, CLOSED OLD TESTS AND SOLUTIONS.  
NOTE2: SHOW ALL WORK IN ORDER TO RECEIVE FULL CREDIT.

① 20  
② 20  
③ 40  
④ 20

20Pts. Perform the base conversions indicated below.

$(2051.8125)_{10} = ( )_{16} = ( )_3 = ( )_2$   
 $(6721.3)_8 - (FFF.D)_{16}$  using two's complement arithmetic.



$(2051.8125)_{10} = (1000000000011.110100)_2$

$(2051.8125)_{10} = (4003.64)_8$  join 3 bits

$(2051.8125)_{10} = (1000000000011.1101)_{16}$  join 4 bits

$(6721.3)_8 = (110111010001.011)_2 = 3537.375_{10}$

$(FFF.D)_{16} = (111111111111.1101)_2 = 4095.625_{10}$

add zero to prevent overflow

$$\begin{array}{r} 011011010001.0110 \\ - 011111111111.1101 \\ \hline \end{array}$$

-ve of  $(FFF.D)_{16}$  in 2<sup>nd</sup> complement is  $000000000000.0011$

$$\begin{array}{r} 011011010001.0110 \\ + 010000000000.0011 \\ \hline 101011010001.1001 \end{array}$$

→ this is the #

$(-) 10001000101110.0111 = 3537.375_{10}$

3. 40 Pts. Determine which of the following Boolean functions are equivalent:

✓  $F_1(A,B,C,D) = AB'C' + AB'D + AB'C + BD + A'B'D' + B'C'D' + AD$

✓  $F_2(A,B,C,D) = \prod M(4, 8, 9, 11, 12, 13)$

✓  $F_3(A,B,C,D) = \sum m(0, 2, 5, 7, 8, 9, 10, 11, 13, 15)$

✓  $F_4(A,B,C,D) = ((A'B')' (A'D)' (A'C)' (BC)' (CD)')' (ABC)' (ACD)')$

$F_5(A,B,C,D) = ((B'+C+D)' + (B'+C'+D)' + (A'+B+D)')' + (A'+B'+D)')$

$F_6(A,B,C,D) = A'B' \oplus CD' \oplus BC \oplus A'D \oplus A'BD \oplus BCD' \oplus A'BC'D \oplus A'B'C \oplus A'B'C'D$

$P_4 = (A'B' + A'D + A'C + BC + CD' + ABC + ACD')$

$P_5 = (BC'D' + BCD' + AB'D + A'BD' + A'BD')$



$P_1 \equiv P_3$

$P_2 \equiv P_4 \equiv P_6$

$P_5$  alone