1. CONVERT 2098_{10} TO 16-BIT BINARY.

$2098_{10} = 2048+32+16+2 =$ **$0000\,1000\,0011\,0010_2$**

0832_{16}

2. USE REPETITIVE DIVISION TO CONVERT 678_{10} TO BASE-5.

5 | 678		
5 | 135	R3	↑
5 | 27	R0	
5 | 5	R2	
5 | 1	R0	
0	R1	

$678_{10} = 10203_5$

3. CONVERT 1111 1010 0101 1011 0010 0110 1100 0001 TO BASE-16.

F A 5 B 2 6 C 1

4. CONVERT A938B46D TO BINARY

1010 1001 0011 1000 1011 0100 0110 1101$_2$

5. STATE THE MAXIMUM NUMBER THAT CAN BE ENCODED IN 20 BITS.

$2^{20}-1 = 1048576-1 = 1,048,575$

6. IF DR. MEIER COUNTS GYM LAPS ON 1 HAND IN BINARY, WHAT IS THE MAXIMUM NUMBER OF LAPS?

$2^n-1 = 2^5-1 = 31$ laps

7. ADD 95 + 134 IN BASE-6.

$95_{10} = 235_6$

$+\ 134_{10} = 342_6$

1021_6

6 | 95		
6 | 15	R5	↑
6 | 2	R3	
0	R2	

235_6

6 | 134		
6 | 22	R2	→ 342_6
6 | 3	R4	
0	R3	

8. WRITE 20416_{10} AS BINARY AND HEXADECIMAL.

$20416 = 16384 + 2048 + 1024 + 512 + 256 + 128 + 64$

$100\ 1111\ 1100\ 0000_2 = 4FC0_{16}$

9. WRITE 42787 IN BINARY, HEX, AND OCTAL.

$42787 = 32768 + 8192 + 1024 + 512 + 256 + 32 + 2 + 1$

$1010\ 0111\ 0010\ 0011_2$

$A\ 7\ 2\ 3_{16}$

$1010\ 0111\ 0010\ 0011_2$

$1\ 2\ 3\ 4\ 4\ 3_8$

10. DETERMINE IF $11010101 + 00110111$ OVERFLOWS.

METHOD 1

$$\begin{array}{r} \boxed{1}\ 1\ 1\ 0\ 1\ 1\ 1 \\ 1\ 1\ 0\ 1\ 0\ 1\ 0\ 1 \\ +\ 0\ 0\ 1\ 1\ 0\ 1\ 1\ 1 \\ \hline 0\ 0\ 0\ 0\ 1\ 1\ 0\ 0 \end{array}$$

YES

METHOD 2: $2^8 - 1 = 255_{max.}$

$$\begin{array}{rl} & 1101\ 0101 = 213 \\ + & 0011\ 0111 = 55 \\ \hline & 268 \end{array}$$

YES