50 pts

Name: _____

Class Day / Time: _____

Due Date: _____

Assignment #1 – Basic Concepts

Show all work. Fill in all boxes.

Do the following arithmetic in the radix indicated:

1. In hexadecimal, subtract the hexadecimal numbers:

```
  7B2
- 46
```

2. In hexadecimal, add the hexadecimal numbers:

```
  2A9
  63D
+ E78
```

3. In binary, subtract the binary numbers:

```
  1011011.10001
- 111110.10110
```

4. In binary, multiply the binary numbers:

```
  101.1
x 1101
```

5. In binary, divide the binary numbers:

$$1011101 \overline{)\ 1001101000001}$$

6. Using a **4 place hexadecimal machine**, show the contents of the internal storage locations of the numbers given in the space provided. Also, show the contents of the internal storage locations after they are combined under the specified operations in **hexadecimal** arithmetic

Convert the base 10 numbers to base 16 before calculating the expression

a) Add 436_{10} from 935_{10}

Show calculations:

Base 16 Number	Internal
_____	☐☐☐☐
_____	☐☐☐☐
+ _____	☐☐☐☐
	☐☐☐☐

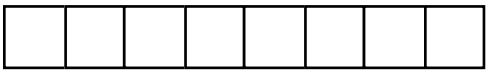
b) Add 962_{10} and 32549_{10}

Show calculations:

Base 16 Number	Internal
_____	☐☐☐☐
_____	☐☐☐☐
+ _____	☐☐☐☐
	☐☐☐☐

7. Assume an **8-digit machine** for the following problems. Represent the following numbers in the format requested. Place your answers in the boxes provided. Show all work.

a. -28 (decimal) in Two's complement notation



b. -7A (hexadecimal) in Two's complement notation

8. Given the Boolean expression (A + C) + A'B' (A' + C'), draw the corresponding gate diagram.

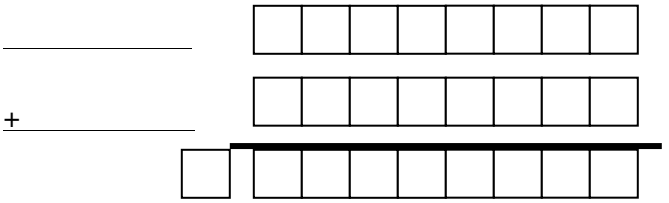
9. Using an **8 place binary machine**, show the contents of the internal storage locations of the numbers given in the space provided. Also, show the contents of the internal storage locations after they are combined under the specified operations in **binary** arithmetic.

Convert the base 10 numbers to base 2 before calculating any needed complement(s).

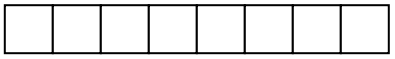
a) Add -23_{10} and 5_{10} using Two's Complement arithmetic.

Base 2 Number Internal

Show calculations:



Final result:

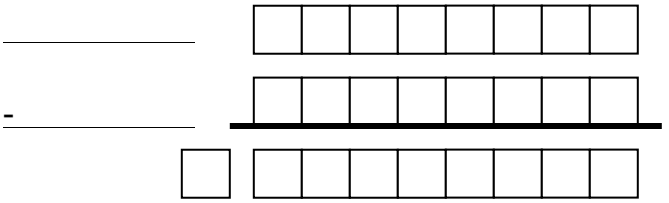


b) Subtract 10_{10} from 24_{10} using Two's Complement arithmetic.

Convert the base 10 numbers to base 2 before calculating any needed complement(s).

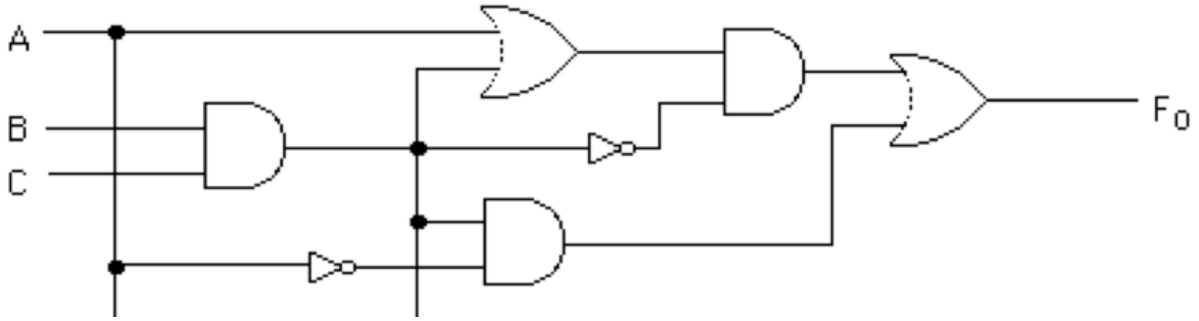
Base 2 Number Internal

Show calculations:



Final result:

10. Express the following functions F_0 in terms of the inputs A, B, and C.



F_0 = _____

11. Prove or disprove the expression: AB + C = (A + C)(B + C) using the truth table given below. Explain your conclusion.

	A	B	C	AB	AB+C	A+C	B+C	(A+C)(B+C)
0								
1								
2								
3								
4								
5								
6								
7								
	1	2	3	4	5	6	7	8

Explanation _____

_____