

Name: \_\_\_\_\_

MATH 308

Fall 2022

HW 15: Due 11/10

*"I memorized the hexadecimal times tables when I was 14 writing machine code, okay? Ask me what 9 times F is. It's fleventy-five."*

*—Erich Bachman, Silicon Valley*

**Problem 1.** (10pt) Showing all your work, convert the following numbers to base-10:

(a)  $9_9$

(b)  $121_3$

(c)  $5F01$

(d)  $1001_{17}$

**Problem 2.** (10pt) Showing all your work, convert the following base-10 numbers numbers in the given base  $b$ :

(a)  $15, b = 7$

(b)  $25, b = 4$

(c)  $88, b = 2$

(d)  $1400, b = 11$

**Problem 3.** (10pt) Showing all your work and without working in base-10, compute the following:

(a)  $1001_2 + 1011_2$

(b)  $101_2 - 11_2$

(c)  $32_5 - 14_5$

(d)  $1A \cdot 2B$

**Problem 4.** (10pt) Suppose you have integers represented in a computer written using only 4-bit binary with the first bit reserved for the sign (1 representing a negative). Using the 2's complement method to find all the representations of the negative integers, give a table of the possible integer values and their binary pattern.