

Math 123-01  
Fall 2025  
Dr. Lily Yen

Quiz Two  
Show all your work

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

Number: \_\_\_\_\_

Signature: \_\_\_\_\_

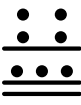
Score: \_\_\_\_/10

**Problem 1:** Convert  $81_{10}$  into base-2.

$81 = 64 + 16 + 1 = 2^6 + 2^4 + 2^0 = 1010001_2$

Score: \_\_\_\_/1

**Problem 2:** The following Mayan numeral has three places. Express it as a Hindu-Arabic numeral.

  $= 2 \times (18 \times 20) + 7 \times 20 + 13 = 873$

Score: \_\_\_\_/2

**Problem 3:** The following Kaktovik numeral has 4 places. Find its Hindu-Arabic numeral.

  $= 12 \times 20^3 + 6 \times 20^2 + 18 \times 20 + 3 = 98\,763$

Score: \_\_\_\_/2

**Problem 4:** Convert  $16\,745_{10}$  to a Babylonian numeral.

$16\,745 = 4 \times 60^2 + 39 \times 60 + 5 =$  

Score: \_\_\_\_/2

**Problem 5:** Fire Horse likes to play with her model dragons. When she lines them up 7 in a row, she has 5 left over. When she lines them up 6 in a row, she finds her last row short of 2 dragons to complete a row. Suppose her collection of dragons contains at least 50, find the smallest possible number of dragons in her collection.

Say she has  $n$  rows of seven. Then the total number of dragons is  $7n + 5$ . Similarly, if she has  $m$  rows of six, the total is  $6m - 2$ . Therefore  $7n + 5 = 6m - 2$ , so  $7n + 7 = 6m$ . The solutions to this equation are

|       |    |    |     |     |     |
|-------|----|----|-----|-----|-----|
| $n$   | 5  | 11 | 17  | 23  | ... |
| $m$   | 7  | 14 | 21  | 28  | ... |
| Total | 40 | 82 | 124 | 166 | ... |

This is another way of finding an answer compared to the solution to the last section of In-class assignment 2.

Score: \_\_\_\_/3