# MATH 190-02 HW1

Matthew Mendoza

TOTAL POINTS

## 39 / 40

QUESTION 1

### 1 Question 1 9 / 10

**- 3 pts** Incomplete in the boxes where you wrote "100k below"

**- 5 pts** You were required to solve Exercises 1.1 on this homework. This answer is good, but you must solve the one required problem.

**- 0 pts** Correct

**- 1 pts** In the Roman numerals section, that over line is only used when the symbols do not exist for large magnitude numbers. You should used Ms for 1000s.

**- 2 pts** Small mistakes in the 310 row, first two boxes.

**- 4 pts** Did not do the first row. Wrong notation for base 6 column.

**- 1 pts** Error in the first base-6 answer.

**- 2 pts** Errors throughout the Chinese column

**- 3 pts** Mistakes in the third row, as well as the first base-6 answer.

**- 2 pts** Errors in the last three boxes of row 2.

**- 1 pts** Small error in final two boxes of row 2.

✓ **- 1 pts** *Couple small mistakes in the Chinese column.*

**- 4 pts** Incomplete table, plus a few small mistakes.

**- 3 pts** Mistakes in the Chinese column, including use of a character we never learned.

**- 1 pts** Error in the Chinese form of 310, and missing a 1 character before the 10 character in 1311.

QUESTION 2

### 2 Question 2 10 / 10

✓ **- 0 pts** *Good*

QUESTION 3

### 3 Question 3 10 / 10

✓ **- 0 pts** *Good*

**- 0 pts** Excellent job! I'm very happy you took on the challenge of this harder problem---and did excellently on it!

**- 7 pts** Did you read the sketch? The problem is to add dots which change the meaning but changing which symbols are in which position. Remember, this is a base-60 system, so the first position is the 1s position, the second is the 60s, the third is the 3600s, etc.

**- 5 pts** Where are parts (a), (c) and (d)?

**- 3 pts** Respond to the questions about arithmetic. What goes wrong if those are a rule of arithmetic?

**- 3 pts** Show that your equals claim is correct.

QUESTION 4

### 4 Question 4 10 / 10

- **0 pts** Good

✓ - **0 pts** *Great job!*

- **4 pts** Justify your answer.

- **3 pts** Where are parts (b) and (c)?

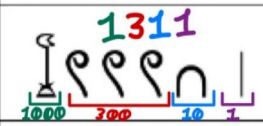
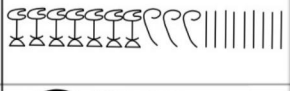
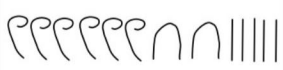
- **6 pts** Explain your answers more. Hoes does zero as an element mean the same thing as nothing? How does a store's inventory mean they are the same? How is "Empty set, there is nothing there" an example of them being different?

# Chapter 01

3 more

# Homework 01 - 1.1, 1.6, 1.7, 1.10

**Exercise 1.1.** Complete the following table so that in each row the numerals represent the same number.

| Type 2 Multiplicative Grouping System (similar to the positional system; instead of indicating which power of b is being used by a digit's position, the power of b is explicitly written) — Chinese | Type 3 Simple Grouping System (symbols are added up) — Egyptian | Type 4 Ciphered Systems (uses some base b, but also need symbols for 1,2,3,…,b−1, but for the b and multiples of b) — Roman | Hindu-Arabic | Base-6 |
|---|---|---|---|---|
| 一千 三百 十一 (1000 300 10 1) |  (1311) | MCCCXI (1000 300 10 1) | 1311 | $(10023)_6$ $(1\cdot6^4)+(0\cdot6^3)+(0\cdot6^2)+(2\cdot6^1)+(3\cdot6^0)$ 1296 0 0 12 3 |
| 七千三百九 (7309) (7000 300 9) |  | VIICCCIX (7000 300 9) | 7309 | $(53501)_6$ |
| 三百 (300) |  | CCCX (300 10) | 310 | $1\cdot6^3+2\cdot6^2+3\cdot6^1+4\cdot6^0=310$ $(1234)_6$ $1\cdot6^3=216$ $2\cdot6^2=72$ $3\cdot6^1=18$ $4\cdot6^0=4$ |
| 六百二十五 (600 20 5) |  | DCXXV (500 100 20 5) | 625 | $(2521)_6$ |
| 一千二百七十五 (1000 200 70 5) |  | MCCLXXV (1000 200 70 5) (1275) | 1275 | $(5523)_6$ |

**Exercise 1.6.** Give two situations where "zero" and "nothing" mean the same thing, and two situations where they don't.

## Mean the same

- Debt: You owe Dr. Cummings $5... You give him $5... You now owe him zero dollars... You owe him nothing.
- Dinning: You're at a restaurant with friends. The restaurant only offers BBQ, but you're vegan, so you order nothing... you didn't order one item... You were there for the "vibes" and company.

## Don't mean the same

- Record keeping: Have information on people's first name and last name, but now want to keep note of their birthday. Until the fields are updated we have "nothing" ↓ NULL
- Using sets: $S=\{0,1,2,3,4\}$ In the set we have zero, one, two, three, and four as element in the set. The cardinality of the set is 5. If we were to remove all 5 elements in the set we wouldn't have 0 element... We would have an empty set... we would have nothing.

## 1 Question 1 9 / 10

**- 3 pts** Incomplete in the boxes where you wrote "100k below"

**- 5 pts** You were required to solve Exercises 1.1 on this homework. This answer is good, but you must solve the one required problem.

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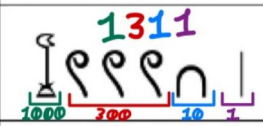
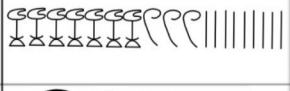
| 一千 三百 十一 (1000 300 10 1) |  (1311) | MCCCXI (1000 300 10 1) | 1311 | $(10023)_6$ $(1\cdot6^4)+(0\cdot6^3)+(0\cdot6^2)+(2\cdot6^1)+(3\cdot6^0)$ 1296 0 0 12 3 |
| 七千三百九 (7309) (7000 300 9) |  | VIICCCIX (7000 300 9) | 7309 | $(53501)_6$ |
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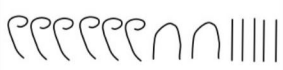
| 六百二十五 (600 20 5) |  | DCXXV (500 100 20 5) | 625 | $(2521)_6$ |
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## *2* Question 2 **10 / 10**

✓ **- 0 pts** *Good*

**Exercise 1.7.**

(a) In your opinion, why do/should people do math?

(b) In your opinion, why do/should people learn math?

(c) In your opinion, why do/should people teach math?

(d) How are these questions different?

(a) We do math because it is in our nature. Math isn't "invented" but is a function of all things… Without thinking an individual acts one way, but in a crowed they behave in another way. That it is advantageous for one, in an evolution standpoint, to know the difference of an and finding the tree that had many apples…

(b) People should learn math not necessarily for it's function and outputs, but to challenge one's logic and reasoning skills. To learn abstract tools and apply them in a specific/unique problem.

(c) Similar to part (b)… To articulate one's understanding is to teach it. Ideas or notions once thought was clear or is unknown can be challenge by others who have a different insight or worked out in collaboration.

(d) These questions are different, for that part-a questions if math is an invention by people or is inherent to all things: nature and the universe (you now know my stance). Part-b provokes the good for individual versus the masses/society… What does one gain by challenging yourself to learn math or what does society benefit from learning math concepts and principles.

**Exercise 1.10.** Show how one could calculate the following using the Tsinghua multiplication table.

20+120+200+1200 = 1540

(a) $35 \cdot 44$ = 1540

2,5+45+400 = 447.5

(b) $89.5 \cdot 5$ = 447.5

.25+2+5+25+200+500 = 732.25

(c) $50.5 \cdot 14.5$ = 732.25

| 1/2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 45 | 90 | 180 | 270 | 360 | 450 | 540 | 630 | 720 | 810 | 900 | 1800 | 2700 | 3600 | 4500 | 5400 | 6300 | 7200 | 8100 | 90 |
| 40 | 80 | 160 | 240 | 320 | 400 | 480 | 560 | 640 | 720 | 800 | 1600 | 2400 | 3200 | 4000 | 4800 | 5600 | 6400 | 7200 | 80 |
| 35 | 70 | 140 | 210 | 280 | 350 | 420 | 490 | 560 | 630 | 700 | 1400 | 2100 | 2800 | 3500 | 4200 | 4900 | 5600 | 6300 | 70 |
| 30 | 60 | 120 | 180 | 240 | 300 | 360 | 420 | 480 | 540 | 600 | 1200 | 1800 | 2400 | 3000 | 3600 | 4200 | 4800 | 5400 | 60 |
| 25 | 50 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 1000 | 1500 | 2000 | 2500 | 3000 | 3500 | 4000 | 4500 | 50 |
| 20 | 40 | 80 | 120 | 160 | 200 | 240 | 280 | 320 | 360 | 400 | 800 | 1200 | 1600 | 2000 | 2400 | 2800 | 3200 | 3600 | 40 |
| 15 | 30 | 60 | 90 | 120 | 150 | 180 | 210 | 240 | 270 | 300 | 600 | 900 | 1200 | 1500 | 1800 | 2100 | 2400 | 2700 | 30 |
| 10 | 20 | 40 | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 400 | 600 | 800 | 1000 | 1200 | 1400 | 1600 | 1800 | 20 |
| 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 10 |
| 4 1/2 | 9 | 18 | 27 | 36 | 45 | 54 | 63 | 72 | 81 | 90 | 180 | 270 | 360 | 450 | 540 | 630 | 720 | 810 | 9 |
| 4 | 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 | 160 | 240 | 320 | 400 | 480 | 560 | 640 | 720 | 8 |
| 3 1/2 | 7 | 14 | 21 | 28 | 35 | 42 | 49 | 56 | 63 | 70 | 140 | 210 | 280 | 350 | 420 | 490 | 560 | 630 | 7 |
| 3 | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 120 | 180 | 240 | 300 | 360 | 420 | 480 | 540 | 6 |
| 2 1/2 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 5 |
| 2 | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 80 | 120 | 160 | 200 | 240 | 280 | 320 | 360 | 4 |
| 1 1/2 | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 60 | 90 | 120 | 150 | 180 | 210 | 240 | 270 | 3 |
| 1 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 40 | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 2 |
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| 1/4 | 1/2 | 1 | 1 1/2 | 2 | 2 1/2 | 3 | 3 1/2 | 4 | 4 1/2 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 1/2 |

## 3 Question 3 10 / 10

✓ **- 0 pts** *Good*

**- 0 pts** Excellent job! I'm very happy you took on the challenge of this harder problem---and did excellently on it!

**- 7 pts** Did you read the sketch? The problem is to add dots which change the meaning but changing which symbols are in which position. Remember, this is a base-60 system, so the first position is the 1s position, the second is the 60s, the third is the 3600s, etc.

**- 5 pts** Where are parts (a), (c) and (d)?

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| 3 | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 120 | 180 | 240 | 300 | 360 | 420 | 480 | 540 | 6 |
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| 1 1/2 | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 60 | 90 | 120 | 150 | 180 | 210 | 240 | 270 | 3 |
| 1 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 40 | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 2 |
| 1/2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 1 |
| 1/4 | 1/2 | 1 | 1 1/2 | 2 | 2 1/2 | 3 | 3 1/2 | 4 | 4 1/2 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 1/2 |

## *4* Question 4 **10 / 10**

**- 0 pts** Good

✓ **- 0 pts** *Great job!*

**- 4 pts** Justify your answer.

**- 3 pts** Where are parts (b) and (c)?

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