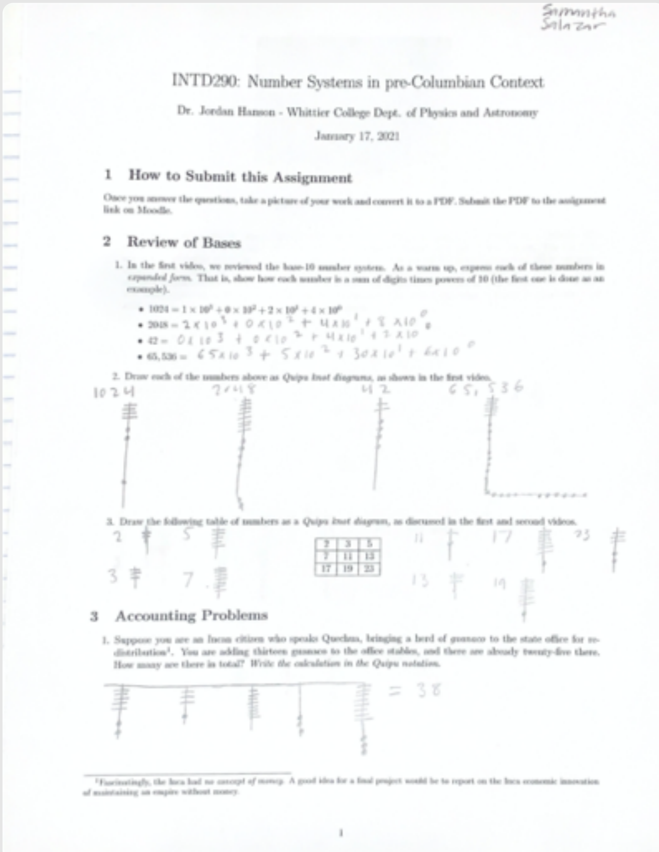
INTD290: Number Systems in pre-Columbian Context



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INTD290: Number Systems in pre-Columbian Context

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1 How to Submit this Assignment

Once you answer the questions, take a picture of your work and convert it to a PDF. Submit the PDF to the assignment link on Moodle.

2 Review of Bases

1. In the first video, we reviewed the base-10 number system. As a warm up, express each of these numbers in *expanded form*. That is, show how each number is a sum of digits times powers of 10 (the first one is done as an example).
   - $1024 = 1 \times 10^3 + 0 \times 10^2 + 2 \times 10^1 + 4 \times 10^0$
   - $2048 = 2 \times 10^3 + 0 \times 10^2 + 4 \times 10^1 + 8 \times 10^0$
   - $42 = 0 \times 10^3 + 0 \times 10^2 + 4 \times 10^1 + 2 \times 10^0$
   - $65{,}536 = 65 \times 10^3 + 5 \times 10^2 + 30 \times 10^1 + 6 \times 10^0$
2. Draw each of the numbers above as *Quipu knot diagrams*, as shown in the first video.

   1024 2048 42 65,536

3. Draw the following table of numbers as a *Quipu knot diagram*, as discussed in the first and second videos.

2	3	5
7	11	13
17	19	23

3 Accounting Problems

1. Suppose you are an Incan citizen who speaks Quechua, bringing a herd of guanaco to the state office for redistribution[1]. You are adding thirteen guanaco to the office stables, and there are already twenty-five there. How many are there in total? *Write the calculation in the Quipu notation.*

   = 38

[1]Fascinatingly, the Inca had *no concept of money*. A good idea for a final project would be to report on the Inca economic innovation of maintaining an empire without money.

1

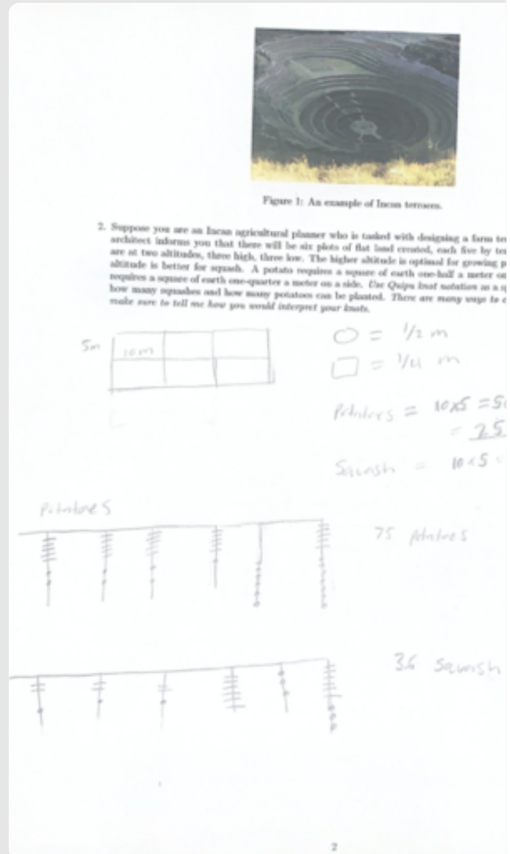

Figure 1: An example of Incan terraces.

2. Suppose you are an Incan agricultural planner who is tasked with designing a farm te[…] architect informs you that there will be six plots of flat land created, each five by te[…] are at two altitudes, three high, three low. The higher altitude is optimal for growing p[…] altitude is better for squash. A potato requires a square of earth one-half a meter o[…] requires a square of earth one-quarter a meter on a side. *Use Quipu knot notation as a* […] how many squashes and how many potatoes can be planted. *There are many ways to* […] *make sure to tell me how you would interpret your knots.*

   5m 10m

   ○ = 1/2 m
   □ = 1/4 m

   Potatoes = 10x5 = 5[…]
   = 25

   Squash = 10x5 […]

   Potatoes

   75 Potatoes

   36 Squash

2