

## MATH 13700. Review for Exam 1.

### "The Intergalactic Chronicles"

The following problems involve different kinds of aliens who live on different planets in the galaxy **Digitax**. All these aliens have number systems involving place value similar to ours, but based on the number of fingers they have. For example:

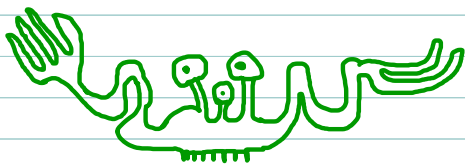
As this picture shows the inhabitants of planet Glauk, (Known as Glaukans), possess nine fingers:



A Glaukan will write that he sees 16 stars when he sees this:



Another planet on the galaxy **Digitax** is Zyxout, its inhabitants, the Zyxouters, look like this:



A Zyxouter will write that there are 23 stars above.

There are also inhabitants on the planets Fohm, Artxex and Eioh.

Keep the drawings above in mind when solving the following problems:

1. The intergalactic olympiads are judged by the Grand Tribunal, (every planet in **Digitax** sends exactly one representative to be a part of the Grand tribunal).

In a jump a rope contest the representative from planet Fohm reported, in writing, that participant A completed 1203 jumps. While the representative from planet Eioh reported, in writing, that participant B completed 1203 jumps. The Grand Tribunal read both reports and determined that the winner of the jump a rope contest was participant B. Who has more fingers, the representative of Fohm or the representative from Eioh? Justify your answer.

2. When inhabitants of Artxx see the following arrangement:



they write 21 stars.

a) How many fingers do inhabitants of Artxx have?

b) What number would an inhabitant of Artxx write if they saw the arrangement



3. An inhabitant from Artxx posted on her Facebook, the following status update.

"I am currently on vacation in planet Zyxout, yesterday I visited a museum, the exhibition rooms were numbered. Sadly, rooms 14, 16 and 20 were not open to the public. But I was able to see the paintings in room 32."

Baa, one of her friends, who was really good at math, commented on her post:

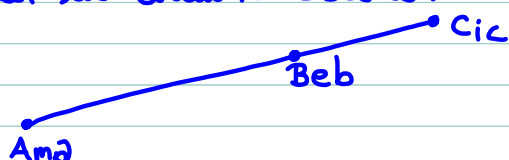
"I think you are visiting Glauk."

To what she replied:

"I am so distracted!!! Yes, I am in Glauk, you genius!"

Can you explain, why Baa knew his friend was not in Zyxout? (There is a mathematical reason behind it!)

4. Ana, Beb and Cic are cities in Planet Zytoux, in a map they appear as drawn below:



According to the travel guides in Zytoux, written by native Zytouxers, the distance from Ana to Beb is 20.5 quarks and the distance from Cic to Beb is 13.4 quarks.

- Are the quantities in this problem continuous or discrete? Justify.
- Write a quantitative analysis if you were asked the question: What is the distance from Ana to Cic?
- What concepts are involved in this problem? Solve the problem.

5. The inhabitants of Eioh have five fingers total.

Laki, an Eiohan, said she would read the novel "Silly Love", which has 4021 pages. She stopped at page 2314. How many pages does she still have to read?

- Are the quantities in this problem continuous or discrete? Justify.
- Write a quantitative analysis for this problem.
- What concept of subtraction is involved in this problem?
- Solve the problem, use a diagram involving drawings of the base five pieces to explain how you subtract.

6. Jen is from Glauk. On her second math test she scored 13 more points than on her first one. When she added both scores she got 71. What was Jen's score on her first exam.

- Write a quantitative analysis for this problem.
- With the help of a strip diagram solve this problem.
- What concepts are involved in this problem?

7. How many fingers do the inhabitants of Fohm have?