Activity # 1 Wrap Up

Counting Rules : single column, single row both count
$m \times n$ and $n \times m$ counted separately
$m \times m$ (square) counts
} for example

Look for patterns. (Can "reverse" first table.)

# rectangles	# rocks
1	
2	
3	
⋮	⋮

State & test at least one conjecture; revise as needed.

... More conjectures &/or explanation(s) ... questions?

Report 1

Pick Activity #1 or Activity #2 to finalize & submit.

↑ May rewrite &/or type.
(See Canvas for details.)

Level of investigation :

- Basic (+10)
- Continued (+5)
- Further (+3)
- Above & Beyond (+2)

Writing & Presentation : (+2.5)

Examples :

Basic (+10) & some progress in Continued (+3)

Readable but sloppy (+1)

14/20 = 70%

Basic (+10) & Continued (+5)

Readable, neat & clear (+2)

17/20 = 85%

Basic (+10), Continued (+5) & Further (+3)

Readable, neat, & clear

20/20 = 100%

Activity #3 Preview

View numbers like 1, 2, 3, ... very _____ ("rocks").

- Addition : _____ groups of rocks
- Multiplication : repeated _____

Subtraction introduces a "problem" ...

$$2 - 6 = ?$$

which leads to an expanded notion of "number"

$$2 - 6 = \square$$

Negative numbers are more _____ than positive numbers.

Examples of negative numbers in daily life:

Why does multiplying two negatives produce a positive?

- Cannot explain with rocks.
- A symbolic explanation :

Agree that $1 + (-1) = 0$

and $0 \times a = 0$ for every number a

and $(x+y)z = xz + yz$ for every three numbers x, y, z.

Then, on one hand,

$$(1 + (-1)) \times (-1) = \_\_ \times (-1) = \_\_$$

and, on the other hand,

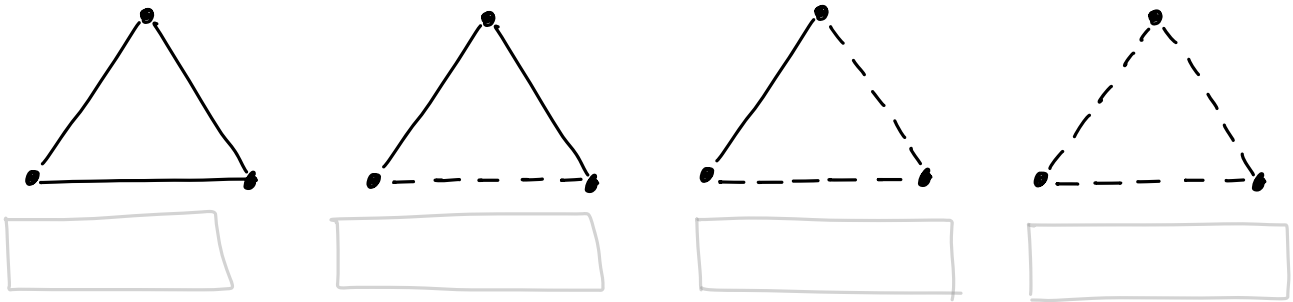
$$(1 + (-1)) \times (-1) = \_\_\_\_ + \_\_\_\_ = \_\_\_\_ + \_\_\_\_.$$

So, putting the two together, we see that:

$0 = (-1) + \_\_\_\_$, which means $1 = (-1) \times (-1)$.

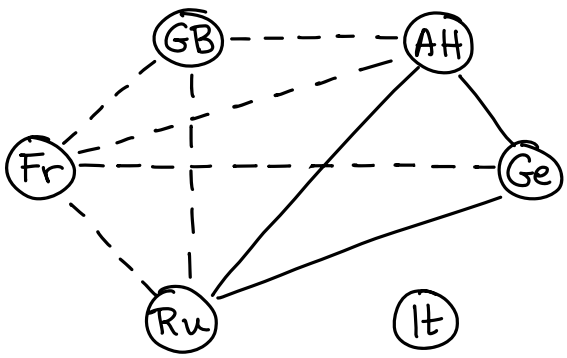
- More intuitive :
  - I'm driving east (positive direction). I do a u-turn & then put the car in reverse. When I press the accelerator, which direction will my car move? _____
  - "The enemy of my enemy is my friend."

Alliances & Hostilities : Balanced or Unbalanced?



Three Emperors' League (1872-81)

Bring your book.



Italy is neutral

Alliances :
- Austria-Hungary (AH) & German (Ge)
- AH & Russia (Ru)
- Ge & Ru

Hostilities :
- Great Britain (GB) & AH
- GB & Ru
- GB & France (Fr)
- Fr & Ge
- Fr & Ru
- Fr & AH

We will act this out : 6 groups (one for each country)
Yellow string : alliance
Red string : hostility

Then work in 3 groups to continue thinking through the different configurations leading up to WWI.