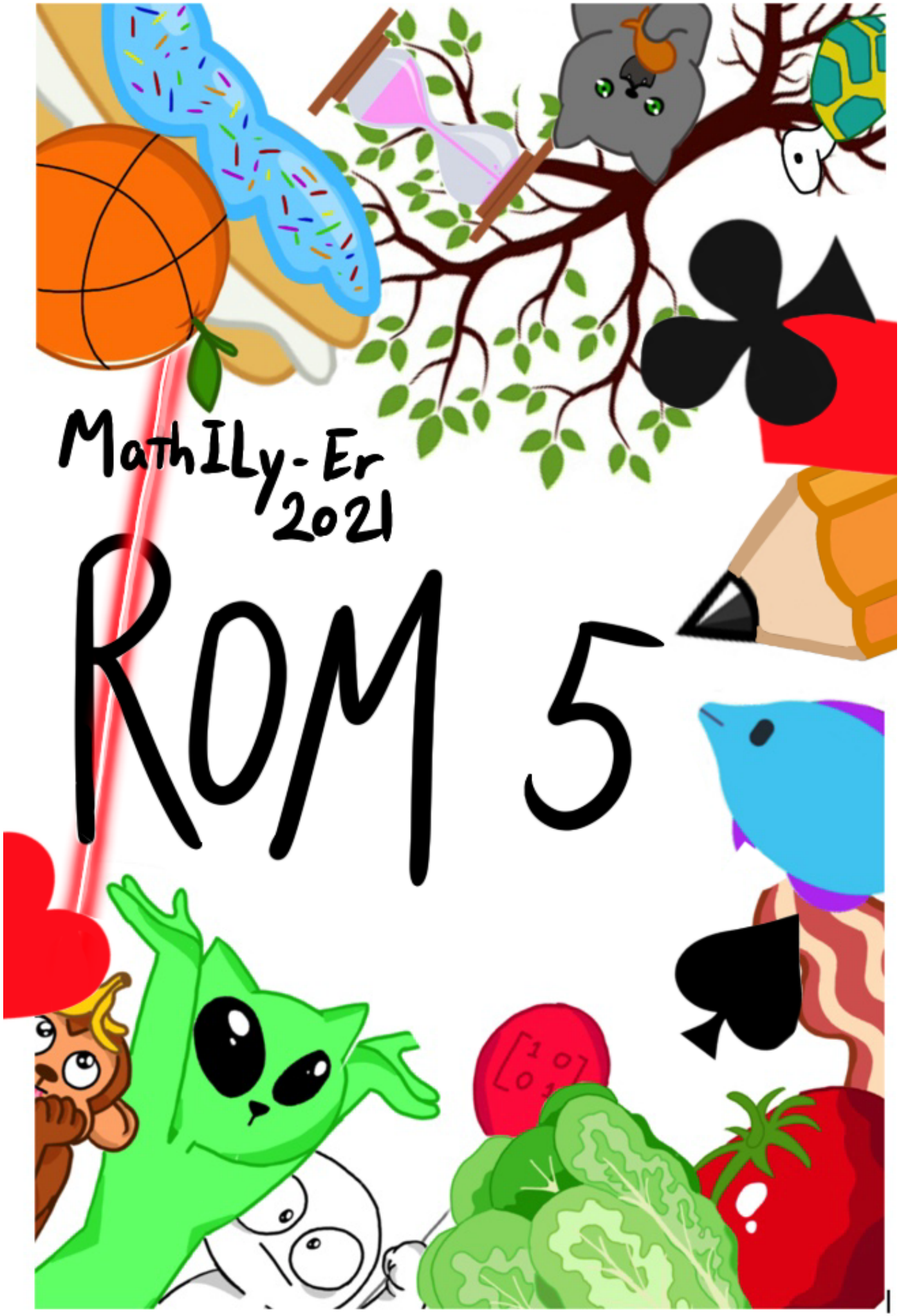
MathILy-Er
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ROM 5

the MathILy-Er Record Of Mathematics (ROM)

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By: Alex D. (Golden Ax), Shubh (Ah, Holy Bugs!), Ashley (Hey, uh... alas?), Katherine (hue ikea entry), Kevin (Knave wing), Mara (I murmur data)

In This Issue

Daily Gather 7/29

By Maureen

We're pretty excited about celebrating Rishi and Estelle's back-to-back birthdays! So, we started off by asking:

1. What are the chances that among n people there will be 2 people with either the same or consecutive birthdays?
2. What is the maximum n before this is guaranteed to occur?
3. How many people do you need for this to have >50% chance of occurring?

Assume that each year has 365 days.

To solve the first problem, we thought of the days in the year as 33 dino tiles (33 birthdays followed by birthday parties) and 299 rainbow tiles (single, boring, non-birthday days) that we need to arrange to create something of total length 365. We can think of this as making a circular quilt of length 365. Using the Fibonacci technique that we used to make quilts in the alien quilting workshop, we can find the chance that among n people there will be 2 people with either the same or consecutive birthdays.

To find the maximum n before this is guaranteed to occur, we evaluate $\left\lfloor \frac{365}{2} \right\rfloor$, giving us 182 people. The third problem is yet to be solved!

We then watched a math movie, "When You Don't Know How to Count Money - Key & Peele," in which two skeptical men struggled to find the quickest way to count money. After using several failed techniques such as searching up what their desired sum of money looks like on the Internet, counting by 20s, and both counting at once, they successfully "Rain Man"-ed it. Unfortunately, they found that they were offered only $99,980, rather than the desired $100,000. After everyone opens fire, a man arrives with a $20 bill, seconds too late.

Then, we returned again to bring about Nate's doom! Sam has given us some additional intel to help us get past Nate's security system:

1. One AI lies, one tells the truth, and one can do either.
2. AI's only say "Asymdope" and "Blort."
3. A good first question to ask: "If I asked if the AI to your left (right) is the random AI, would you say Asymdope?"

To get past Nate's security system, we pose question 1 above to the AI in the middle. If we get the response "Blort," we ask the next question to the AI to the left. If the answer we get is "Asymdope," we ask the next question to AI to the right. This way, the AI you ask the second question is either the truth teller or the liar, but not the random AI. Then ask, "If I were to ask you if you are the truth teller, would you say Asymdope?" Lastly, ask the question, "If I were to ask you if the one in the middle is random, would you say Asymdope?" Using this strategy, we can get past Nate's security system once and for all!