**{Mathscryption}**

**General Rules**: This is a card game played with a standard 52 card deck and a sticky notes pad, which will be provided by the Moderators. Two teams of one or two players each will be competing against each other. One player will be the 'Solver' the other the 'Architect’ in each team. One player can also play both of these roles. Every game is divided into two stages. The first stage will take 20 minutes. The second stage will have five turns and take no more than 20 minutes as well. Calcs are only allowed in the first stage of the round (calc is short for calculator).

Stage 1: Solvertaire

**Questions**: During the first stage, Solvers from both teams will start solving math questions to accumulate ‘Energy’. They can choose questions based on difficulty: Easy, Medium or Hard. Each solver can attempt a maximum of 25 questions in the 20 minutes.

**Energy Accumulation**: Easy difficulty gives 2 Energy; Medium gives 3 Energy while Hard difficulty gives 4 Energy. The goal is to fill up as much of the energy bar as possible within the 20 minutes. The Energy Bar for a team is full after 100 Energy is obtained by the Solver. There will be no negative marking (energy deduction) in case of wrongly answered questions.

Stage 2: Mathjack

**Card Types**: When the second stage starts, 3 piles will be made available to the Architects: First will be a shuffled deck contain the 36 numbered cards (2 to 10 for each suit) of the standard deck, second will be another shuffled deck contain the 16 special cards (A, J, Q, K for each suit) and the third pile will be of sticky notes.

**Energy Use**: At the start of turn one, the Architects can spend energy as follows: 1 energy to get a random card from the numbered deck, 2 energy to get a blank sticky note and 4 energy to get a random card from the special deck. Architects can have a maximum of 4 numbered cards, 3 notes and 2 special card in Hand at any given instant. After each turn, architects can spend energy again.

**Cap, Answer, Aggregate**: Every turn, a random 'Cap' target will be introduced for both architects, such as the number 55. They must build an expression using their cards and notes. The ‘Answer’ to this expression must not exceed the Cap number (refer to: Blackjack). Any answer over the cap is taken as zero. If an answer is not an integer, it will be rounded down to the nearest whole number. The 'Answer' is added to “Aggregate” score of the team (which is initialized at zero).

**Expressions**: Architects can use a maximum of eight items (max four cards and four notes) to build their expression. They can put the following operator symbols on their notes: multiplication, division, addition or subtraction. They can then use these between cards in their expression. Otherwise, they can use a blank sticky note to concatenate two cards forming a two-digit number (but no more than that). For example, cards 2 and 3 can become 23. Architects will play expressions simultaneously and must make a valid expression in under 150 seconds to avoid a penalty.

**Special Cards**: The Ace, Jack, Queen and King cards are then used for their special abilities. Each of the 16 special cards (4 from each suit) have different abilities. The 16 abilities are shown as a Table (Page 4) for the Architects to refer to during the round. Architects can play a maximum of one and a minimum of zero specials per turn.

**Victory Condition**: *The game ends when five turns are over , when the deck of numbered cards is exhausted or after both players run out of energy (whichever condition is met first).* The team with the most aggregate points at the end of the game wins. If both teams have the same aggregate points at the end, the winner will be the team that had accumulated more energy during the first stage. If that is a tie as well, then the Moderators (provided on page 4) will decide the winner based on performance in the first two rounds of Vinculum.

**Example Mathjack Turn**

*The turn starts, the cap is set at 55 and players draw their cards and notes.*

Architect One plays the following expression:

**9 \* 8 - 25**

This uses seven items (four notes and three numbers) and the answer computes to 47, which is under the cap.

Then they use a special card, the Ace of Spades, which adds sum of the digits of the perfect squares and perfect cubes from the expression to the aggregate. This adds 9, 8, 2 and 5 to the aggregate.

Hence their aggregate is now 47+9+8+2+5, which is **73.**

Meanwhile, Architect Two played the following expression:

**23 \* 2 - 5**

This uses seven items (a note for double digit, two notes for operations and four numbers), the answer here computes to 41, which is also under the cap.

Then they play the Ace of Clubs, which multiplies points to be added to aggregate by the number of prime numbers in the expression, if the answer is a prime number. Since 41 is a prime number, this card works. The expression has 3 prime numbers, 23, 2 and 5, so 41 is multiplied by 3.

Hence the opponent’s aggregate is now 41\*3 which is **123**.

*The turn ends.*

**Round Format**

Only eight of the best teams will qualify for this round based on performances in the first two rounds of Vinculum. They will compete in a standard single elimination knockout tournament. Two teams compete in a single match. There will be 4 Quarterfinals, 2 Semifinals and 1 Finale. The winning teams advance while losing teams are eliminated. The tournament bracket will be decided by Moderators (random or seeding). Each game will be 40 minutes long and the tournament will take 3 hours to complete.

Each game will be conducted by three moderators:

**Questioner:** Will provide questions to both solvers during Solvertaire, check their answers, award energy and keep track of their energy bar.

**Dealer:** During Mathjack, ensures that the game is fair, the rules limiting the cards in hand and the cards played are not broken, the conditions for special abilities to apply are met, the abilities are applied correctly. Dealers also have the ability to alter any game rules if they consider them to be exploitable.

**Bookkeeper:** Before each Mathjack turn, keeps track of the energy spent and energy remaining for both architects. Computes answers, points added to aggregate and total aggregate at the end of each MathJack turn. Ensures that the cap is not exceeded by anyone. The energy and aggregate will be displayed clearly to both Architects during the round.

**Tips and Tricks**

* Be familiar with all 4 suits and the face cards of the standard deck.
* In Solvertaire, 100 energy is maximum, but aim realistically; 75-80 energy is not bad considering the card drawing limitations and Special Card Abilities.
* Git gud at math.
* You do not need to use all of your hand in a single turn. Save some operators and numbers that might help you trigger special card abilities for the next round. Similarly, strategize on how to spend energy each turn. Do not let your opponent monopolize the special or numbered cards.
* Be sharp with Mental Maths. You and your opponent will be building expressions simultaneously. The Bookkeeper will not compute answers until end of the turn, but you can do so beforehand to determine if the opponent is ahead of you.
* Be familiar with Prime numbers, Fibonacci sequence and other special numbers which trigger special card abilities.
* Bend the rules, but don’t exploit them. Use the trivial mechanics of the game to your advantage without . e.g., any answer over the cap is taken as zero, but the special abilities can still apply to the expression to score points.

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| **Card** | **Ability Name** | **Effect** |
| **Ace of Spades** | Power Rule | If your expression contains perfect squares or perfect cubes, add sum of their digits to answer. |
| **Ace of Hearts** | Why was 6 afraid of 7? | If 7,8 and 9 cards are played in the expression (in any order), add 100 points to aggregate. |
| **Ace of Clubs** | Prime Factor | If your answer is a prime number, multiply it by the number of primes in your expression. |
| **Ace of Diamonds** | The Golden Spin | If your expression contains three numbers in the Fibonacci series add previous rounds points to aggregate again. |
| **Jack of Spades** | Newton vs Leibniz | Steal a random card from opponent’s hand at start of turn. |
| **Jack of Hearts** | Jack of all Trades | Both architects show each other all their cards and trade one card at start of turn. |
| **Jack of Clubs** | Null Set | Does literally nothing. |
| **Jack of Diamonds** | Peekaboo | Next time you draw a card, take a peek at the first three cards of that deck and choose any one. |
| **Queen of Spades** | Rotation by 90° | In your expression, change a plus [ + ] into a multiply [ x ] and a multiply in to a plus. |
| **Queen of Hearts** | Q.E.D | If your expression is exactly equal to the cap, gain triple points. |
| **Queen of Clubs** | Polarity Switch | Change any number of sixes (6) into nines (9) and vice versa. |
| **Queen of Diamonds** | Law of Equivalent Exchange | You get zero answer points this turn but double points are added to aggregate next turn. |
| **King of Spades** | Note for Sale | Allow a free note to be drawn next turn. |
| **King of Hearts** | Special Discount | Special Cards now only cost 3 energy. |
| **King of Clubs** | Reduce, Reuse, Recycle | From now on, unused numbered cards in hand at the end of turn are shuffled back into the deck and the architect gains energy. |
| **King of Diamonds** | Carry Over | If you win this game, your unused energy is stored for the next game. |

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