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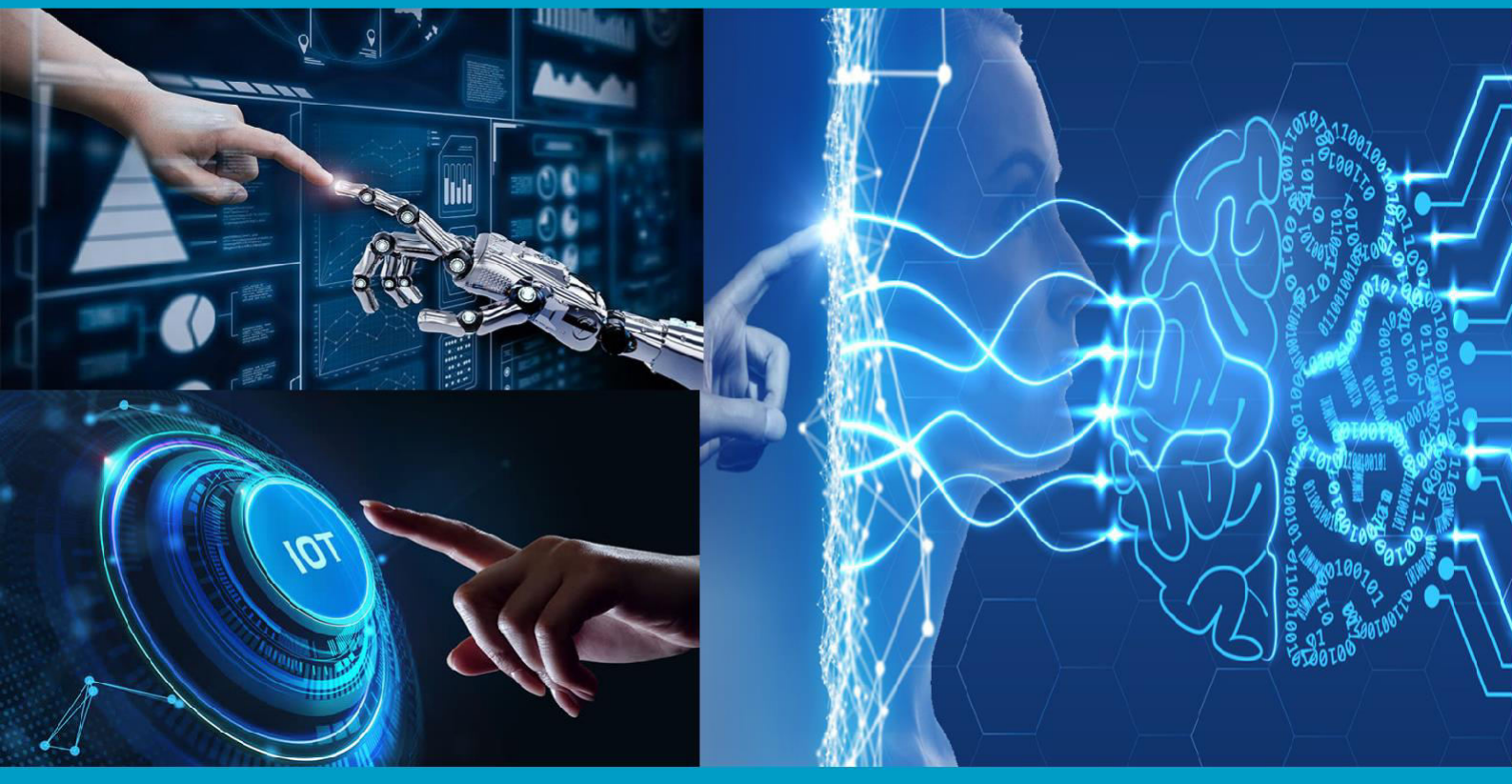

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ROLL TWO DICE AND CALCULATE A PROBABILITY. IS MATH REALLY IMPORTANT IN SCHOOL?

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ABSTRACT: Math isn't just an important subject in school — it's essential for many of your daily tasks. You likely use it every day to perform real-life skills, like grocery shopping, cooking and tracking your finances.

What makes math special is that it's a universal language — a powerful tool with the same meaning across the globe. Though languages divide our world, numbers unite us. Math allows us to work together towards new innovations and ideas.

Why math is important for kids and adults. Plus, find out why learning even the most basic math can significantly improve your family's quality of life.

Why is math so important in life?

You simply can't make it through a day without using some sort of basic math. Here's why.

A person needs an understanding of math, measurements and fractions to cook and bake. Many people may also use math to count calories or nutrients as part of their diet or exercise routine.

You also need math to calculate when you should leave your house to arrive on time, or how much paint you need to redo your bedroom walls.

And then the big one, money. Financial literacy is an incredibly important skill for adults to master. It can help you budget, save and even help you make big decisions like changing careers or buying a home.

Mathematical knowledge may even be connected to many other not-so-obvious benefits. A strong foundation in math can translate into increased understanding and regulation of your emotions, improved memory and better problem-solving skills.

KEYWORDS-math, school, dice, probability, calculate

I. INTRODUCTION

Probability is also known as a possibility, which works in the happening of a likely event. The utility is designated from zero to one. In math, Probability has been obvious to approximate how possible events are to occur. Basically, the probability is the scope to which something is to be expected to take place.

Probability

To understand probability more exactly, let's understand an example of flipping a coin, the possible outcomes are – head and tail. The possibility of happening any of the likely events is 1/2. As the possibility of occurring any of the likely events is the same so there is an equal possibility of happening any favorable affair, in this case, it is 1/2.

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| Volume 10, Issue 2, February 2023 |

Formula of Probability
P(A) = {Number of affair A} / {Total number of affair} [1,2,3]

DICE
Dice is a small block that has between one and six mark or tint on its boundary and is used in games to give a randomly integer. Dice are small, tossable blocks with a detectable boundary that can stop in respective figures. They are handed down to give stand-up to respective figures, often as part of sideboard games, as well as dice games, board games, role-playing games, and games of chance.

A usual die is a block with each of its six sides detectable with a different integers of figures from one to six. When throwable or rolled, the die comes to pause shows a random number from one to six on its higher side, with the happening of each affair being equally likely. Dice may also have concave or unequal shapes and may have faces noticeable with figures or characters instead of the pit. Filled dice are drawn to favour some results over others for break out or relaxation.

How to calculate Dice Probabilities?

Answer:

- One Dice Rolls

The uncomplicated and easiest case of dice probabilities is the possibility of occurring a specific integer with one dice. In probability, the primary act is that one must compute it by looking at the number of likely events in collation to the desired events.

Dice presents six likely events. Furthermore, the attentiveness of the independent would be only for one affair disregarding of the choice of integer. A dice probability calculator would be totally convenient in this regard.

The formula one may use in this case is,

P(A) = {Number of affair to A} / {Total number of affair}
Therefore, the odds of getting a specific number, if the number is 6, this gives,

Probability = 1 ÷ 6 = 0.167

Probabilities are accessible as numbers between no possibility and reliability. Furthermore, no possibility resembles 0 and reliability resembles 1. An independent can multiply this by 100 to operate a percentage. As a consequence, the possibility of getting 6 on the dice is 16.[4,5,6]7%.

- Two or More Dice

The probabilities definitely get a little more complex to work out when two dice are concerned. The calculation of uncommon probabilities takes place when one wish to know the probability of getting two 6s by throwing two dice. Most remarkable, the result of one dice does not rely upon on the result of the other dice.

Unconventional probabilities have the rule that one must multiply the individual probabilities jointly to attain the outcome. Therefore, the formula for this is,

Probability of both = Probability of result one × Probability of result two

- Total Score from Two or More Dice

If an individual wants to know the likelihood of getting a particular total sore by rolling two or more dice, then one must go back to the simple rule.

This simple rule is probability = number of likely result divided by the number of likely results. Again, the use of a dice probability calculator is critical here. Calculating the number of result one is concerned in requires more work. If an individualistic wish a total score of 4 on two dice, then this is attainable by rolling 1 and 3, 3 and 1, or 2 and 2.

Furthermore, the individual must observe the dice individually, 1 on first dice and 3 on other dice is surely different than a 3 on first dice and 1 on the second dice. For rolling a 4, there are three ways to get the result one wishes. Hence, there are 36 likely result. The work out of this is as follows,

Probability = Number of desired outcomes/Number of possible outcomes = 3 ÷ 36 = 0.0833.

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| Volume 10, Issue 2, February 2023 |

The proportion comes out to be 8.33 percent. Also, 7 is the most favourable outcome for two dice. In addition, there are six ways to attain it. The probability in this case is 6 ÷ 36 = 0.167 = 16.7%.

Similar Problems[7,8,9]

Question 1: Find the probability of retrieving a sum of 8 on throwing two dice?
Answer:
There are 36 total likely results on throwing two dice i.e., $6^2 = 6 \times 6 = 36$.

There are 5 total possibility of retrieving a sum of 8 on throwing two dice i.e., (2, 6), (3, 5), (4, 4), (5, 2), (6, 2).

Hence, the probability of retrieve a sum of 8 on throwing two dice is 5/36.

Question 2: Shawn tosses a die 400 times and he documents the score of getting 6 as 30 times. What could be the probability of
a) retrieving a score of 6?
b) retrieving a score under 6?
Solution:
a) P (getting a score of 6)

= Number of times getting 6/total times

= 30/400

= 3/40

b) P (getting a score under 6)

= number of times getting under 6/total times

= 370/400

= 37/40

a) P (getting 5) = 3/40

b) P (getting under 6) = 37/40

Question 3: What is the probability of retrieving a sum of 6 if two dice are thrown?
Solution:
When two dice are rolled, n(S) = 36. Let, A be the event of getting a sum of 6. Then,

A = {(3, 3), (2, 4), (4, 2), (1, 5), (5, 1)}

n(A) = 5

Hence, the required probability will be,

P(A) = n(A)/n(S) = 5/36.

Question 4: Find the probability of throwing two dice and retrieving a sum of 4.
Solution:
The set of possible outcomes when we roll a die are {1, 2, 3, 4, 5, 6}

So, when two dice are rolled, there are 6 × 6 = 36 chances.

When we roll two dice, the probability of retrieving number 4 is (1, 3), (2, 2), and (3, 1).

So, the number of favorable outcomes = 3

Total number of possibilities = 36

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| Volume 10, Issue 2, February 2023 |

Probability = {Number of likely affair } / {Total number of affair} = 3 / 36 = 1/12.

Thus, 1/12 is the probability of rolling two dice and retrieving a sum of 4.

II. DISCUSSION

The importance of math: 9 benefits of a great math education

Math offers more opportunities beyond grade school, middle school and high school. Its applications to real-life scenarios are vast.

Though many students sit in math class wondering when they'll ever use these things they're learning, we know there are many times their math skills will be needed in adulthood. [10,11,12]

The importance of mathematics to your child's success can't be overstated. Basic math is a necessity, but even abstract math can help hone critical thinking skills — even if your child chooses not to pursue a STEM-style career. Math can help them succeed professionally, emotionally and cognitively. Here's why.

1. Math promotes healthy brain function

"Use it or lose it." We hear this said about many skills, and math is no exception.

Solving math problems and improving our math skills gives our brain a good workout. And it improves our cognitive skills over time. Many studies have shown that routinely practicing math keeps our brain healthy and functioning well.

2. Math improves problem-solving skills

At first, classic math problems like Johnny bringing home 42 watermelons and returning 13 of them can just seem a silly exercise. But all those math word problems our children solve really do improve their problem solving skills. Word problems teach kids how to pull out the important information and then manipulate it to find a solution.

Later on, complex life problems take the place of workbooks, but problem-solving still happens the same way. When students understand algorithms and problems more deeply, they can decode the facts and more easily solve the issue. Real-life solutions are found with math and logic.

3. Math supports logical reasoning and analytical thinking

A strong understanding of math concepts means more than just number sense. It helps us see the pathways to a solution. Equations and word problems need to be examined before determining the best method for solving them. And in many cases, there's more than one way to get to the right answer.

It's no surprise that logical reasoning and analytical thinking improve alongside math skills. Logic skills are necessary at all levels of mathematical education.

4. Math develops flexible thinking and creativity

Practicing math has been shown to improve investigative skills, resourcefulness and creativity.

This is because math problems often require us to bend our thinking and approach problems in more than one way. The first process we try might not work. We need flexibility and creativity to think of new pathways to the solution. And just like anything else, this way of thinking is strengthened with practice.

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| Volume 10, Issue 2, February 2023 |

5. Math opens up many different career paths

There are many careers that use a large number of math concepts. These include architects, accountants, and scientists.

But many other professionals use math skills every day to complete their jobs. CEOs use math to analyze financials. Mailmen use it to calculate how long it will take them to walk their new route. Graphic designers use math to figure out the appropriate scale and proportions in their designs.

No matter what career path your child chooses, math skills will be beneficial.

6. Math may boost emotional health

While this research is still in its early days, what we have seen is promising.

The parts of the brain used to solve math problems seem to work together with the parts of the brain that regulate emotions. This suggests that math practice can actually help us cope with difficult situations. In these studies, the better someone was with numerical calculations, the better they were at regulating fear and anger. Strong math skills may even be able to help treat anxiety and depression.

7. Math improves financial literacy

Though kids may not be managing their finances now, there's going to be plenty of times where math skills are going to make a massive difference in their life as an adult.

Budgeting and saving is a big one. Where can they cut back on their spending? How will budgeting help them reach their financial goals? Can they afford this new purchase now?

As they age into adulthood, It will benefit your child to understand how loans and interest work before purchasing a house or car. They should fully grasp profits and losses before investing in the stock market. And they will likely need to evaluate job salaries and benefits before choosing their first job.

8. Math sharpens your memory

Learning mental math starts in elementary school. Students learn addition tables, then subtraction, multiplication and division tables. As they master those skills, they'll begin to memorize more tips and tricks, like adding a zero to the end when multiplying by 10. Students will memorize algorithms and processes throughout their education.

Using your memory often keeps it sharp. As your child grows and continues to use math skills in adulthood, their memory will remain in tip top shape.

9. Math teaches perseverance[13,14,15]

"I can do it!'

These are words heard often from our toddlers. This phrase is a marker of growth, and a point of pride. But as your child moves into elementary school, you may not hear these words as often or with as much confidence as before.

Learning math is great for teaching perseverance. With the right math instruction, your child can see their progress and once again feel that "I can do it" attitude. The rush of excitement a child experiences when they master a new concept sticks in their memory. And they can reflect back on it when they're struggling with a new, harder skill.

Even when things get tough, they'll know they can keep trying and eventually overcome it — because they've done it before.

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| Volume 10, Issue 2, February 2023 |

Why students struggle to master certain math concepts

Many students experience roadblocks and hurdles throughout their math education. You might recognize some of these math struggles below in your child. But don't worry! Any struggle is manageable with the right support and help. Together, you and your child can tackle anything.

Here are some of the most common math struggles.

- Increasing complexity

Sometimes the pace of class moves a bit faster than your child can keep up with. Or the concepts are just too abstract and difficult for them to wrap their mind around in one lesson. Some math ideas simply take more time to learn.

- Wrong teaching style

A good teaching style with plenty of practice is essential to a high-quality math education. If the teacher's style doesn't mesh well with how your child learns, math class can be challenging.

- Fear of failure

Even as adults, we can feel scared to fail. It's no surprise that our children experience this same same fear, especially with the many other pressures school can bring.

- Lack of practice

Sometimes, all your child needs is a little more practice. But this can be easier said than done. You can help by providing them with plenty of support and encouragement to help them get that practice time in.

- Math anxiety

Algorithms and complex problems can strike anxiety in the heart of any child (and many adults). Math anxiety is a common phenomenon. But with the right coping strategies it can be managed.

Set your child's math skills up for success with Prodigy Math

Now we've discovered just how important math is in both our everyday and life decisions, let's set the next generation up for success with the right tools that'll help them learn math.

III. RESULTS

Prodigy Math is a game-based, online learning platform that makes learning math fun for kids. As kids play and explore a safe, virtual world filled with fun characters and pets to collect, they'll answer math questions. These questions are curriculum-aligned and powered by an adaptive algorithm that can help them master math skills more quickly.[16,17,18]

Plus, with a free parent account, you'll also get to be a big part of their math education without needing to be a math genius. You'll get to:

- Easily keep up with their math learning with a monthly Report Card
- See how they're doing in math class when their teacher uses Prodigy Math
- Send them motivational messages to encourage their perseverance in math

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| Volume 10, Issue 2, February 2023 |

Want to play an even bigger role in helping your child master math? Try our optional Math Memberships for extra in-game content for your child to enjoy and get amazing parent tools like the ability to set in-game goals and rewards for them to achieve.

Prodigy Education, Inc., formerly Prodigy Game, is a Canadian educational technology company focused on game-based learning. Its co-CEOs and founders are Alex Peters and Rohan Mahimker.[1] It is the developer of the 2011 and 2022 educational video games Prodigy Math, a roleplaying game where players solve math problems to participate in battles and cast spells, and Prodigy English, a sandbox game where players answer English questions to earn currency to gain items. Although each game is standalone, both are accessible through a single Prodigy account. The games are widely used in schools. Prodigy has attracted criticism due to excessive in-game advertising for membership and the freemium aspects of their games.[2]

Prodigy Math

Prodigy Math or Prodigy Math Game is an educational fantasy massively multiplayer online role-playing game (MMORPG) released in 2011 by Prodigy Education. The player takes the role of a wizard, who, whilst undertaking quests to collect gems, must battle against the Puppet Master. These quests usually involve battling monsters in different areas of the in-game map. To participate in these quests, players must correctly answer math problems to cast spells. Prodigy Math was released in 2011.[3][4]

Development

The game began development as a school project by University of Waterloo engineering students Rohan Mahimker and Alex Peters.[5][6] Mahimker sought to address, in part, what he saw as the lack of appeal of most educational software aimed at children. Mahimker and Peters published Prodigy initially under the label of SmarTeacher, Inc.[5] Mahimker and Peters initially focused on utilizing biometrics and facial recognition software to personalize the educational experiences of students, but they later abandoned the focus on hardware to focus more on the in-game software.[6]

Gameplay

Teachers can use the game to assign homework and monitor students. The game sells players items that they can use to customize their avatar, and has a "paid premium" membership level. The game uses a turn-based battle system. Prodigy Math integrates math exercises into its gameplay.[6] The game borrows concepts from Pokémon and World of Warcraft.[5]

Plot

The player controls a wizard, which is the main protagonist of the game, in a place called Prodigy Island. The game initially starts with a short tutorial, where the wizard is shown sleeping in a house. A fairy named Noot wakes up the wizard and takes them out of their house, telling them that they have to go to the Academy, a school where wizards are trained to cast spells.

On the way to the Academy, the wizard encounters a monster. Noot teaches them how to use magic to defeat the monster. To cast spells, the player has magic points with a maximum of 2 at a time, when all are used up the player must answer a math question to refill it back to two again. After defeating that monster, the wizard encounters a set of 5 monsters to choose from to use as their first "starter" pet. Monsters, when caught and trained, can also be controlled by the player; they can cast spells and attack in battles with other wizards and/or monsters.

When Noot and the wizard reach the Academy, the wizard first encounters the Puppet Master, the main antagonist of the game. The Puppet Master then proceeds to attempt to destroy the five Warden Keystones, but instead scatters the stones across Prodigy Island. The Keystones allow the five elemental towers (places where students can learn different elements of magic) in the Academy to stay open, so as soon as the Puppet Master attempts to destroy the Keystones, the towers are locked. It is then the player's mission to travel to the five elemental subareas within Prodigy Island (Firefly Forest, Shiverchill Mountains, Bonfire Spire, Skywatch and Shipwreck Shore) to find these Warden Keystones and return them back to the Academy.

Growth and reception

In 2013, Mahimker claimed that the game's playerbase was growing at a monthly rate of approximately 50 per cent.[5] By January 2021, Prodigy Math had about 100 million registered users and nine million active monthly users, its growth affected by the need for distance learning caused by the COVID-19 pandemic.[6]

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In February 2021, Fairplay, an American advocacy organization, criticized the "freemium" model of Prodigy Math, stating that the models are "manipulative" and "promote inequity"[19,20,21]

Research

According to the Johns Hopkins University, students in fourth grade were more likely to score higher on standardized assessments if they used Prodigy more extensively.[9]

Prodigy English

On April 21, 2022, Prodigy English was launched for grades 1 to 5. According to Prodigy Education, the new game encouraged players to "build their own online world, collecting supplies and exploring an exciting and interactive environment while learning curriculum-aligned English skills."[10]

Criticism and controversies

Criticism of premium model

In February 2021, Fairplay, formerly the Campaign for a Commercial-Free Childhood, an American advocacy organization, submitted a complaint to the Federal Trade Commission regarding the premium model of Prodigy Math. The organization stated that "[while it] does cost nothing for schools to implement Prodigy, the in-school version encourages children to play at home" and that "And when children play at home, they are met with a steady stream of advertisements promoting a 'premium annual membership' that costs up to $107.40."[2][7][8]

James Bigg, a spokesman for Prodigy Math Game, responded to these allegations by stating in an email interview that the game notifies players about memberships "from time to time". Furthermore, Bigg has stated that "[Prodigy Education looks at] this responsibly and sparingly so it does not detract from the free game play experience or educational quality. ... [they] do not pressure users into upgrading."[11]

IV. CONCLUSION

In contemporary education, mathematics education—known in Europe as the didactics or pedagogy of mathematics—is the practice of teaching, learning, and carrying out scholarly research into the transfer of mathematical knowledge.

Although research into mathematics education is primarily concerned with the tools, methods, and approaches that facilitate practice or the study of practice, it also covers an extensive field of study encompassing a variety of different concepts, theories and methods. National and international organisations regularly hold conferences and publish literature in order to improve mathematics education.[21]

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