



Old Math Problem About Music Geometry Solved After 70 Years

Description

A professor, along with his team, have solved a difficult math problem. This problem is about understanding the shape of a drum from the sounds it makes. Professor Iosif Polterovich from the Université de Montréal is very interested in these types of questions. He used a part of math called spectral geometry to learn more about how waves move.

Polterovich, along with researchers Nikolay Filonov, Michael Levitin, and David Sher, figured out a special case of a well-known problem in spectral geometry. This problem was originally proposed by a famous mathematician, George Pólya, in 1954. The problem relates to calculating the frequencies of a drum. Until recently, this problem had only been solved for shapes like triangles and rectangles, but not for the shape of a disk.

Polterovich and his friends published an article in 2023 where they proved that Pólya's problem could indeed be solved for the shape of a disk. This was a challenging task. Though their work is mostly of theoretical interest, it might also be helpful in practical areas such as computer math and computation. They are now looking into this.

Polterovich said that while math is a basic science, it is also like sport and art. Like in sport, solving difficult math problems is challenging. Like art, finding a simple solution is beautiful. And sometimes, beautiful math solutions can also be very useful.

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Vocabulary List:

1. **Solved** // (verb): Found a solution or an explanation for a problem or mystery.
2. **Geometry** // (noun): A branch of mathematics dealing with the properties and relations of points, lines, surfaces, solids, and higher-dimensional analogs.
3. **Frequencies** // (noun): The rate at which something occurs or is repeated over a particular period of time.
4. **Theoretical** // (adjective): Concerned with or involving the theory of a subject or area of study rather than its practical application.
5. **Practical** // (adjective): Relating to what is real rather than to what is possible or imagined suitable for a particular purpose.
6. **Beautiful** // (adjective): Pleasing the senses or mind aesthetically.

Vocabulary quizzes

Multiple Choice (Select the Correct answer for each question.)

1. What is the process of providing medical care to improve a patient's health?
Option: A. Cure
Option: B. Treatment
Option: C. Prevention
Option: D. Diagnosis
2. Who are individuals trained to travel and work in space?
Option: A. Astronomers
Option: B. Cosmonauts
Option: C. Astronauts
Option: D. Pilots
3. Which branch of mathematics deals with shapes, sizes, and properties of space?
Option: A. Trigonometry
Option: B. Algebra
Option: C. Geometry
Option: D. Calculus
4. What is an evaluation or assessment of something such as a movie or product?
Option: A. Critique
Option: B. Review
Option: C. Summary



Option: D. Conclusion

5. What happens when something is postponed or not done immediately?

Option: A. Rushed

Option: B. Quick

Option: C. Delayed

Option: D. On time

6. Which term describes something based on experience and observation rather than theory?

Option: A. Theoretical

Option: B. Hypothetical

Option: C. Practical

Option: D. Imaginary

7. What is a term used to describe something thrilling or full of excitement?

Option: A. Boring

Option: B. Monotonous

Option: C. Exciting

Option: D. Tedious

8. What is the total income generated by a business through its operations?

Option: A. Expense

Option: B. Capital

Option: C. Revenue

Option: D. Profit

9. Which term means to have enough money to pay for something?

Option: A. Borrow

Option: B. Save

Option: C. Afford

Option: D. Donate

10. Which term refers to the state of being protected from harm or danger?

Option: A. Danger

Option: B. Risk

Option: C. Safety

Option: D. Hazard

Gap-Fill (Fill in the blanks with the correct word from the vocabulary list.)

11. How do you feel when you are extremely _____ ?



12. What should you do if the faucet is _____ ?
13. A(n) _____ was made against the suspect in the investigation.
14. Helium is a _____ gas that is often used in balloons.
15. Remember to regularly _____ your important files to avoid data loss.
16. The sunset over the ocean was truly _____ .
17. Our main _____ in the market just released a new product.
18. Taking breaks and practicing self-care are important for maintaining good _____ .
19. The company decided to adjust its _____ strategy to attract more customers.
20. The interest _____ on the loan was higher than expected.

Matching Sentences (Match each definition to the correct word from the vocabulary list.)

21. He felt a deep sense of sorrow and melancholy upon hearing the news.
22. The bridge serves to link the two sides of the river allowing people to cross over.
23. The storm caused severe harm to the property leaving it in a state of disrepair.
24. The legal action taken against the company resulted in a lengthy court case.
25. The radio operator adjusted the frequencies to tune in to different stations.
26. After hours of investigation the detectives finally cracked the case and solved the mystery.
27. The exchange rate between the two currencies fluctuates daily based on market conditions.
28. The scientist proposed a groundbreaking theory that challenged existing beliefs in the field.
29. Due to budget constraints they could not afford to purchase the new equipment.
30. The latest smartphone model quickly became popular among tech enthusiasts worldwide.



Answer

Multiple Choice: 1. B. Treatment 2. C. Astronauts 3. C. Geometry 4. B. Review 5. C. Delayed 6. C. Practical
7. C. Exciting 8. C. Revenue 9. C. Afford 10. C. Safety

Gap-Fill: 11. Angry 12. Leaking 13. Allegation 14. High 15. Back up 16. Beautiful 17. Competitor 18. Mental
health 19. Pricing 20. Rate

Matching sentence: 1. Sadness 2. Connect 3. Damaged 4. Lawsuit 5. Frequencies 6. Solved 7. Rate
8. Theoretical 9. Afford 10. Popular

CATEGORY

1. Sci/Tech - LEVEL2

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