Storytelling and Creativity in Mathematics

Presented by:
PHILIPP LEGNER
Storytelling and Creativity in Mathematics

Philipp Legner – @MathigonOrg
“It is the view of the ministry that a theoretical knowledge will be sufficient to get you through your examinations, which after all is what school is all about.”
Storytelling
Trigonometry

\[ \cos 48^\circ = \frac{b}{14} \]
\[ 14 \cdot \cos 48^\circ = b \]
\[ 9.36 \approx b \]
NOJLI TOWER.

A STATION OF THE GREAT TRIGONOMETRICAL SURVEY BUILT IN THE PLAINS OF UPPER INDIA NEAR ROOKER.

FROM WHICH THE HIMALAYAN PEAKS OF RASHUNATH, KEDARNATH, JAGHILI AND BANDARGUNCH HAVE BEEN OBSERVED.

FROM A PHOTO BY J.D. SINGH.

ELEVATION, SECTIONS & PLANS.
Illustrative of Colonel Everest's Towers on the Great Arc.

Transverse Section

Elevation

Plan of Platform

Ground Plan

Plan of 1st Story

Section on line a-b

OLD ZENITH SECTOR, (RAMSDEN'S)
Roller Coasters
Roller Coasters
Cicadas
Carbon Dating
Carbon Dating
Monopoly
Roulette
Roulette

Red
Black
RRB
BRR
RRR
RBR
BBR
RBB
BRB
BBB
RB
BR
RR
BB
THE SIMPSONS AND THEIR MATHEMATICAL SECRETS

SIMON SINGH

AUTHOR OF FERMAT'S LAST THEOREM
TODAY'S MATH JOKE
\[ \sqrt{1} \ 2^3 \ \Sigma \pi \]
AND IT WAS DELICIOUS

TONIGHT'S ATTENDANCE:
A) 8,101
B) 8,128
C) 8,208
D) No way to tell

\[ M(H) = \pi \left( \frac{1}{117} \right)^{6} \sqrt{\frac{hc}{G}} \]

\[ 3967^{12} + 4365^{12} = 4472^{12} \]
\[ \Omega(t) > 1 \]

\[ \text{DODECAHEdRON} \]
Mathematics is full of stories!

- Applications
- Science and Nature
- Games and Puzzles
- History and Mathematicians
- Fiction
Creativity
Tessellations
Polyhedra
Volume
Surface Area
Nets/Cross Sections
Euler’s Formula
5 Platonic Solids
### Dragons

This model requires one quadratic sheet of paper.

1. **Fold horizontally and vertically along centre.**
2. **Flip over and fold along both diagonals.**
3. **Put two opposite corners on top of each other, to create a smaller square.**
4. **Fold the bottom edges towards the centre.**
5. **Repeat previous step on opposite side.**
6. **Fold top triangle down. Unfold the previous three steps.**
7. **Fold the bottom corner upwards.**
8. **Repeat previous step on opposite side.**
9. **Fold top two edges towards the centre.**
10. **Repeat previous step on opposite side.**
11. **Fold bottom corner onto line in centre of top half.**
12. **Repeat for top corner. Unfold. Fold bottom corner inwards. Fold top corner as shown.**
13. **Rotate unit and repeat steps 3 to 8 at opposite end.**
14. **Fold entire unit along its centre.**

Each of these 30 units will form the edge of one tetrahedron. At every vertex, three units link together: one of each colour.

15. **Connect all 6 units in any one colour to make the first tetrahedron.**
16. **For the second and third tetrahedra, first create one corner (tripod) and interlink it with the existing shape. Then lock it in place using the remaining three edges of that colour.**
17. **Add the fourth and fifth Tetrahedra in a similar way.**

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Modular Origami
MandelComp = Compile[
   {{c, _Complex}},
   Module[{num = 1},
     FixedPoint[(num++; #^2 + c)&, 0, 8191, SameTest->(Re[#]^2 + Im[#]^2>=4&)];
     num],
   CompilationTarget->"C",
   RuntimeAttributes->{Listable},
   Parallelization->True
 ];

Mandelbrot[x_, y_, m_] := ArrayPlot[
   MandelComp@Table[a + I b,
     {b, y - 2.7 * 2^-m, y + 2.7 * 2^-m, 0.005 * 2^-m},
     {a, x - 4.8 * 2^-m, x + 4.8 * 2^-m, 0.005 * 2^-m}(*0.002*)
   ] / 8192,
   ColorRules->{1->Black},
   ColorFunction->MandelColor,
   ColorFunctionScaling->False,
   Frame->False,
   PixelConstrained->1
 ];
$\frac{12\sqrt{2}}{2} \approx 1.5$
Rhythm

![Diagram of musical notes showing relationships between whole, half, quarter, eighth, and sixteenth notes.]

**RHYTHM ADDITION LEVEL 1**

Directions: Add the total number of beats in each problem.

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Resources
Noun: Parallelogram  

Pronunciation: /ˌpəˈrælələɡram/  

1. A portmanteaux word combining parallel and telegram. A message sent each week by the Parallel Project to bright young mathematicians.
Welcome to the FIFA World Cup!

From making penalties fairer or taking the perfect free kick, to designing an ideal ball and predicting results using an octopus, it's all there in our collection of football articles. Take your pick!
IMAGINARY is your place for open and interactive
“Pure mathematics is, in its way, the poetry of logical ideas.”

Albert Einstein
Are you sure about that? You can still change your mind and select a different door...

I'm sure!

A great choice, but let me make life a little easier for you. I'll open one of the other doors with a goat, so that there are only two doors left for you to pick from. Do you want to stick with your choice or change your mind now?
Thanks for listening!

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