

1st Annual Math Quiz 2020

Prelims

Rules

Rules

- There are 23 questions in the Prelims.
- You have 27 minutes to answer all of them in the Google Form.
- Fibonacci Numbered questions are starred questions which will determine ties. The first two such numbers for our case are 1 and 2.
- The marks distribution is stated clearly.

Question 1

How many starred questions are there in this prelims?

Seven (1, 2, 3, 5, 8, 13, 21)

Question 2

The term X originates from the **latin word for mother** and was first used in this sense by **James Joseph Sylvester** in 1850 who thought of it as the object “out of which different systems of Y may be engendered as from the womb of a common parent”.

The word X is also used in other fields such as biology, chemical analysis, geology, etc. in which it has different meanings. Perhaps the most famous use of X for the public is a movie franchise.

Identify X.

Matrix

Question 3

One of the more recent feuds in mathematics is related to the X conjecture, named after a **French polymath**. While it is widely acknowledged that Y gave a *perfectly rigorous* proof of the conjecture, a controversial article in The New Yorker suggested that another mathematician, a 1982 Fields Medalist tried to steal away some of the credit due to Y .

Who are X and Y ? (5 points for each)

X=Poincaré, Y=Gregori Perelman

Question 4

Who is blanked out?

Explain the meme.

(5 points for each part)



**Ed Sheeran, these are his album
names**

Question 5

Who is speaking about whom? (5 points for each)

<https://www.youtube.com/watch?v=SXgPMaIZuco>

**Eugene Wigner about John von
Neumann**

Question 6

X lends his name to a famous concept/object in **knot theory**. In 1990, X was awarded the **Fields Medal**, and he became the only person to receive the medal in an unusual manner.

Identity X and the manner in which he received the medal.

(5 points for each)

**X is Sir Vaughan Jones, he wore a
New Zealand All Blacks jersey
while accepting his award**

Question 7

A has been working on B for more than 50 years now. The original intention was to have only one book but then it expanded to seven volumes and finally A said it was more likely the number will be five. Out of these, three parts have appeared in full in the years 1968, 1969, and 1973. The first part of the fourth volume appeared in 2011, the second part of the fourth volume is still being written with two thirds of it completed.

One of the best side-effects of writing B was the invention of C and D which have completely revolutionized digital typography. Identify all four parts, A-D.

(2.5 points for each part)

**A=Donald Knuth, B=The Art of
Computer Programming, C & D =
TeX & METAFONT**

Question 8

What is not widely known is that X revolutionized handwriting and calligraphy when he introduced the cursive letter E that we were taught to write in school. But, what is widely known is X's work on projections, namely his 'failure' in some sense. But once we understand that X's projection is conformal, that is a projection in which every angle between two curves that cross each other on a sphere is preserved in the image of the projection we would be more willing to overlook this 'failure'.

Who is X?

Gerardus Mercator

Question 9

The X universe is one of the exact solutions of the Y field equations which gives rise to strange phenomenon, including the possibility of time travel.

X is however not known for his physics as much as he is known for his mathematics. Many stories abound about X and his dealings, including one where he found a logical inconsistency in the constitution of the United States wherein a dictatorship would be possible.

It was also said that Y told people that he went to his office to have the privilege of walking back to his home with X.

Who are X and Y? (5 points for each part)

X=Gödel, Y=Einstein

Question 10

The use of this particular convention goes back to Descartes, who is usually credited as being the first person to do this. However, this was not intentional on the part of Descartes, it was his printer, who while printing one of Descartes' books was out of letters and just decided to adopt this convention which has stuck.

What convention?

Using x , y , z , etc. for variables in algebra

Question 11

The name of this geometrical object was coined by Galileo who was also the first person to study it seriously. This object has also been closely associated with a famous problem whose name comes from the Greek words for 'shortest time'.

Which is this geometrical object that has been compared to Helen of Troy, not only for its beauty but also for its many controversies?

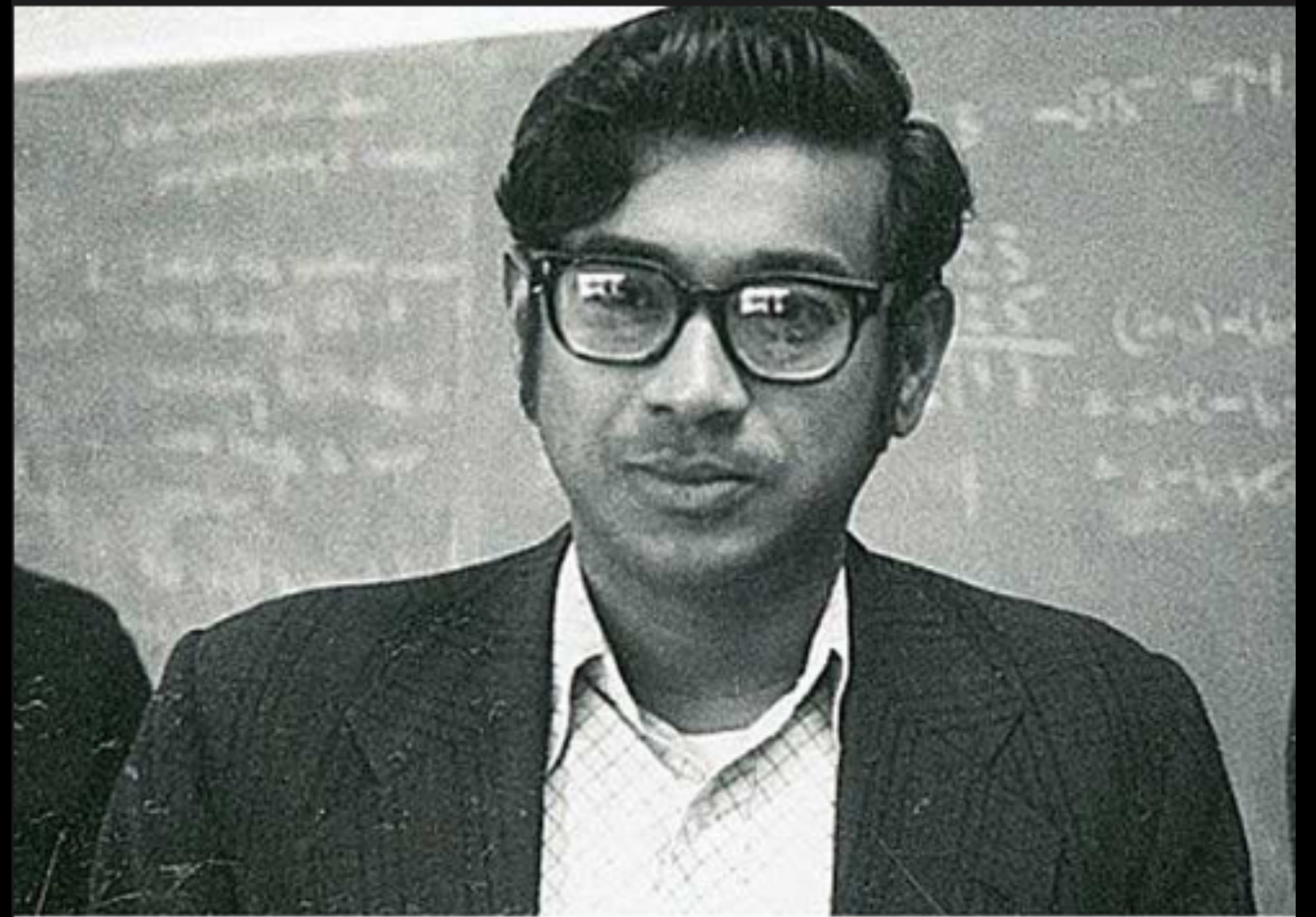
Cycloid

Question 12

Identify this famous mathematician who is often mistaken for X in popular media.

Also identify who is X.

(5 points for each part)



S. R. S. Varadhan, X=Ramanujan

Question 13

Who is usually considered to be the first person to be knighted for services to learning in the sciences and mathematics?

Sir Issac Newton

Question 14

Which country's constitution has a 24 step mathematical process of constructing something which is the only one of its kind? What is that something?

(5 points for each part)

Nepal, constructing its flag

Question 15

X was a pioneer in the field of visual representation of statistics, but is now widely known for her work in some other area. X is credited with developing a type of Pie Chart now sometimes named after X which has sectors with equal angles but not the same length from the center. This was used extensively by X to show the causes of death in wars. X's election to the Royal Statistical Society was also a landmark event.

Who is X?

Florence Nightingale

Question 16

Although there are several proofs of the Pythagorean theorem (in fact, some say it is the most proved theorem in all of mathematics), one particular proof that appeared in the now renamed Journal of Education has received much fanfare and glamour over the years.

Why?

President James A. Garfield (of
USA) gave that proof

Question 17

The Hewitt-Marczewski-Pondiczery theorem is a result on the density of products of topological spaces, while **Descartes snark** is an undirected graph with 210 vertices and 315 edges.

What is the connection between the nomenclature of these two disparate mathematical objects?

Pondiczery and Blanche
Descartes were pseudonyms of
matheaticians

Question 18

The ancient Greek word for a central open public space, like a public square is also the name of a movie based on a famous mathematician. Identify the name and the mathematician.

(5 points for each part)

Agora, Hypatia

Question 19

Who is shown holding the calipers?

Also, part of which famous painting?

(5 points for each part)



Euclid, The School of Athens

Question 20

Among the books edited or written by X are Y and Z , anthologies which are named after two famous quotations of Sir Issac Newton and Leopold Kronecker.

Identity X , Y and Z .

(5 points for X , 2.5 points for Y and Z each)

X=Stephen Hawking, Y & Z are
God Created the Integers & On
the Shoulders of Giants

Question 21

Bernoulli numbers are a sequence of rational numbers which appear frequently in number theory and combinatorics. They are interesting for many reasons but for this quiz we are interested in two such instances. The first instance was in the 19th century when X wanted to calculate these numbers using a new and radical manner. What was this manner?

The second instance occurs in the first half of the 20th century when Y wrote his first research paper about these numbers in the Journal of the Indian Mathematical Society. Who is Y?

(5 points for each part)

Ada Lovelace wrote a computer program to calculate them, Y is Ramanujan

Question 22

The INR 2 note is the second smallest Indian note that was introduced in 1943 and removed from circulation in 1995. As with other denominations, the style of the note had a distinctive feature on the obverse and the reverse side.

Identify what has been depicted on the reverse side of the INR 2 note that was introduced in the year 1976.



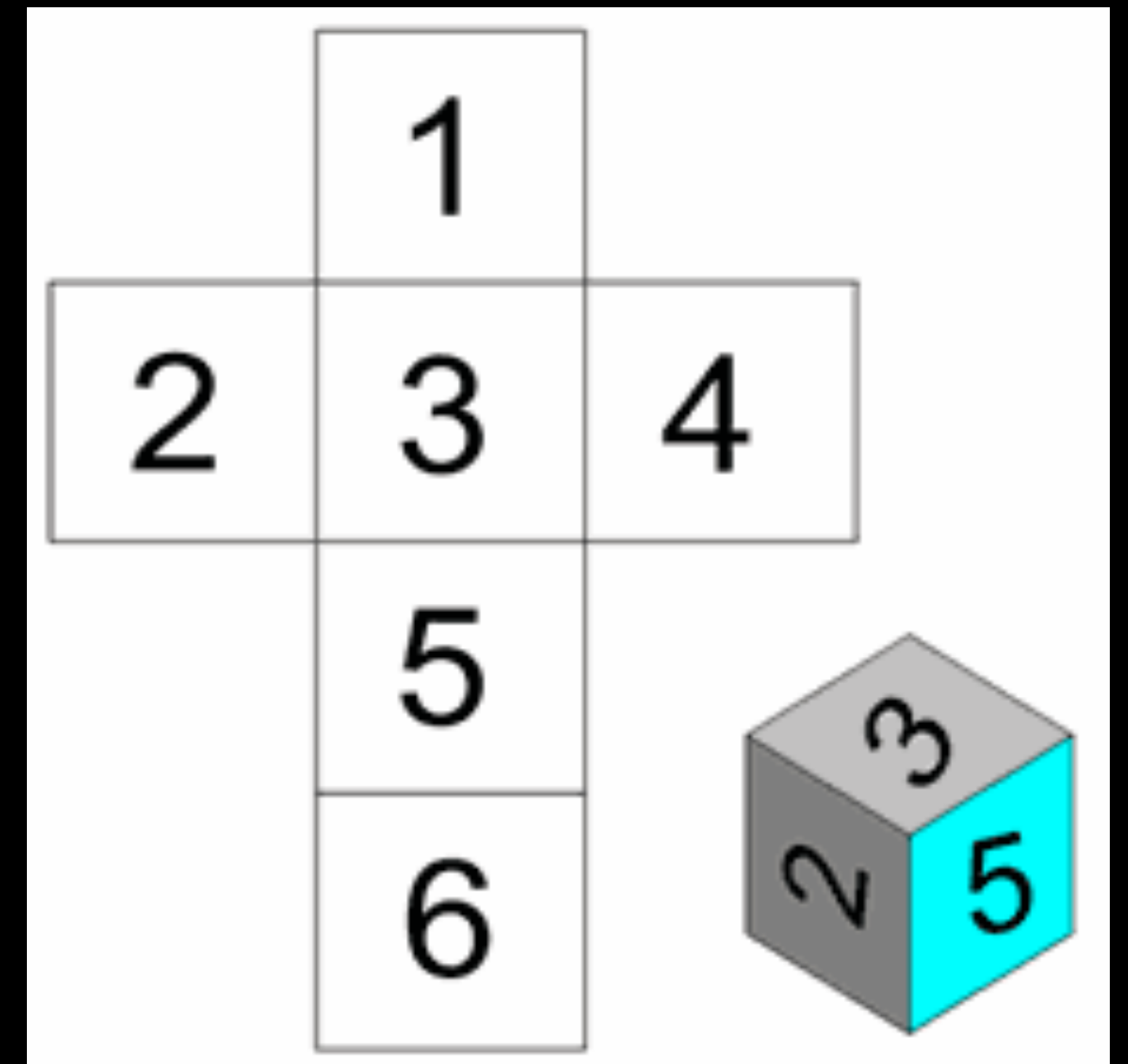
Aryabhata, India's first satellite

Question 23

In geometry, the term X denotes the pattern that one can cut and fold to make a model of a solid shape. Shown alongside, is the X of a cube.

In the accounting parlance, X would refer to “whatever is left after all deductions have been made”.

What is X ?



Net

The End