1. Divide 10 into two numbers such that their product is 40.

2. What were the three famous problems of antiquity?

3. This mathematician spent much of his life on the calculation of **pi,** finally finding it to 35 places. It was engraved on his tombstone in Leyden.

4. What did the Pythagoreans call a number that is divisible by 4?

5. Who solved the four-color problem?

6. What is the third **perfect** number?

7. What does 9.869604…. equal to?

8. What is the first **abundant** number?

9. *Melancholia,* an engraving by Dürer, shows a magic square with the date in which it was made. What is this date?

10. What is the sum of the first four **triangular** numbers?

11. What is the sum of the first four **perfect** numbers?

12. What is the sum of the first ten **lucky** numbers?

13. 85 can be represented as the sum of two squares. Give one sum.

14. 0.010101010101…..represents what fraction?

15. He worked in the Swiss patent Office in Bern from 1902 to 1909. Those seven years were the most creative of his life. Who is he?

16. What is the only square Fibonacci number, apart from 1 ?

17. What is the first and smallest pair of **amicable** numbers?

18. She is generally considered the first computer programmer.

19. How many home-runs did Babe Ruth have?

20. Who discovered the second pair of **amicable** numbers?

21. What mathematician is associated with the number 1729 ?

22. Who was called *The Father of Mathematical Physics ?*

23. What do we call a 1 followed by one hundred zeros?

24. The motto "let no one ignorant of geometry enter here" was said to be on the entrance of what building?

25. The discovery of the existence of incommensurate magnitudes in geometry was disturbing to the ancient Greeks. This difficulty was brilliantly resolved by him with his theory of proportion.

26. This ancient mathematics book was compiled primarily as a textbook for students. It is organized in 13 Books and with no fewer than 467 propositions.

27. Who is known as *The Great Geometer* ?

28. This mathematician published the first textbook on Calculus in 1696.

29. This mathematician spent twenty years as a wandering scholar, earning his living by teaching mathematics. He wrote a treatise dealing with algebra and including a method for solving polynomial equations equivalent to "Horner's Method" in the West.

30. He traveled widely and learned Arabic methods from a Muslim teacher.
The first chapter of his book opens with this sentence:
These are the nine figures of the Indians : 9 8 7 6 5 4 3 2 1. With these nine and with the sign 0 (Zephirum in Arabic) any number can be written and will below be demonstrated.

31. This mathematician was twelve years old when he received severe head wounds from the saber of a French soldier during the sack of Brescia.
For some time afterwards he could hardly talk and always stuttered.
Hence, his nickname.

32. He said: *Je pense, donc je suis.*

33. He stated that given any number of fixed lines in a plane, the locus of points such that the sum of any multiples of the segments drawn at a given angle from the point to the given line is a straight line.

34. This mathematician invented and built one of the earliest calculating machines in order to assist his father in reorganizing the collection of local taxes.

35. His masterpiece (first published in 1687) consists of three Books. Book 1 and Book 2 are mainly mathematical while Book 3 is a prose essay with substantial mathematical insertions.

36. This great mathematician was guided by a few general philosophical ideas, which he sought to apply in many different fields. One of these is what we call the *characteristica generalis*, a general symbolic language into which all processes of reasoning could be translated.

37. This mathematician was a great notation builder: he introduced or established in use many notations that we now take for granted. For example: π ,e, log x f(x). He was called *"Analysis Incarnate"*.

38. He obtained his PhD for a dissertation in which he proved (the first proof ever) that every algebraic equation in one variable has at least one root.

39. His greatest achievement was to create an algebra of logic expounded in two books: T**he Mathematical Analysis of Logic** and **An Investigation of the Laws of Thought.**

40. This fabulous American actress/singer was offered the role of Mrs. Robinson in the movie The Graduate, but she turned it down fearful that it would tarnish her wholesome image.

41. A legendary film actress and an avant-garde composer devised a revolutionary invention: spread-spectrum radio, based on the rapid switching of communication signals among a range of different frequencies. Without it we would not have wireless phones, Bluetooth networks, GPS devices and much more. Who were they?

For questions 42 – 50: Name the movie described in each

42. Based on a real-life teacher in Los Angeles who inspired his underachieving class to perform beyond expectations.

43. A group of hackers, techies, and espionage experts who are tasked by the US government to steal a code-breaking device, only to get tangled up in the investigation of a mathematician's murder.

44. Richard Feynman's relationship with his first wife, tragically dead at 25 and his work on the atomic bomb.

45. It centers on number theorist Max Cohen, whose life is consumed with mathematics and finding patterns.

46. Based on the life of Alan Turing, a brilliant British mathematician and cryptoanalyst, who led a code-cracking team that aided the Allies during the Second World War.

47. The true story of Black female mathematicians who played a critical role in the early days of NASA.

48. Three mathematicians and one inventor are invited to a house under the premise of solving a great enigma, and told to use pseudonyms based on famous mathematicians. They are trapped in a room and they must solve puzzles given by their host in order to escape the slowly closing walls of the room.

49. A character in this fantasy recites the Pythagorean Theorem after receiving a precious gift.

50. Set in the early 1900's. This film traces the life of a prodigious Indian mathematics genius from the time he was a young Tamil Brahmin to his years in Cambridge university, England.

State Convention

Thank you for participating in the 2021 FAMAT Fall Interschool! We have two more tasks for you.

• Come up with a 2022 State Convention poster topic. Each school may submit more than one topic suggestion. Members of the FAMAT Board will review all suggestions and choose the topic.

• Create a design for the 2022 State Convention T-shirt/Program Cover.

Black and white, camera ready, pictures may be placed on standard white copy paper. A second copy of the same picture with suggested colors can also be turned in.

The school whose design is selected by the FAMAT Board for the front of the State Convention t-shirt will receive two free student registrations for the State Convention while the school whose design is selected for the back of the t-shirt will receive one free student registration. Schools may submit more than one design.

Poster topic and t-shirt/program logos must be emailed by Wednesday, November 3 to famatconvention@gmail.com with the subject ”2022 State Convention Poster Topic Suggestions” for poster topics and ”2022 State Convention T-Shirt Designs” for t-shirt designs.

Please remember to include contact information when sending your email.

For each t-shirt design attachment, please save it as:

SchoolName ArtistName BW (change BW to Color for the color version)

And, once again, remember to email your answer sheet for this test by November 3 to robsnow23@yahoo.com.