

- | | | | |
|-----------|--|-----------|--|
| _____ 1. | Evaluate: 4.25^2 | _____ 17. | The altitude of an equilateral triangle is 1. What is its area? |
| _____ 2. | Given that 2019 has exactly four factors, what is the largest prime factor of 2019? | _____ 18. | The mean of n numbers is 21. If we take a 27 out of the set, the mean is now 19. What is n ? |
| _____ 3. | A card is drawn from a standard 52 card deck and kept face down. If another card is drawn, what is the probability that the second card is an ace? | _____ 19. | What is the maximum number of times a square and a circle may intersect? |
| _____ 4. | Find the sum of the factors of 24. | _____ 20. | Evaluate: $\log_2(8192\sqrt{2})$ |
| _____ 5. | Find the sum of the six smallest triangular numbers. | _____ 21. | What is 2019% of 30? |
| _____ 6. | Write $>$, $<$, or $=$:
$3^{\log 5}$ ($>$, $<$, $=$) $5^{\log 3}$ | _____ 22. | Evaluate: $1111_3 + 1111_3 = x_{10}$ |
| _____ 7. | Express 10110101_2 in base 16. | _____ 23. | Evaluate: $\sum_{i=1}^{10} \binom{10}{i}$ |
| _____ 8. | Solve for x : $3x - 1 = \frac{11}{9}x + \frac{7}{12}$ | _____ 24. | Evaluate: $\sum_{n=2}^{\infty} \frac{n}{2^n}$ |
| _____ 9. | A region consists of two squares overlapping such that each has a vertex on the other's center. If a random point is chosen, what is the probability that it is in the overlapping region? | _____ 25. | Evaluate: $63 \times 32 - 45^2$ |
| _____ 10. | Given that the 9 th and 10 th Fibonacci numbers are 34 and 55, find the sum of the first ten Fibonacci numbers. | _____ 26. | If $f(x) = 2 - x^2$, at what values of x does f intersect its inverse? |
| _____ 11. | Simplify: $\frac{12}{\sqrt{13}-2}$ | _____ 27. | What is 111×111 ? |
| _____ 12. | What are the last two digits of 101^{101} ? | _____ 28. | Evaluate: $41 \times 59 - 47 \times 53$ |
| _____ 13. | Find the product of the real zeros of $x^3 - 2019$. | _____ 29. | Evaluate: $36^2 + 48^2$ |
| _____ 14. | Simplify: $\sqrt{784}$ | _____ 30. | Compute: $\frac{1}{2} - \frac{3}{7} + \frac{1}{3}$ |
| _____ 15. | Jonathan rolls an 8-sided die (from 1-8) and then may roll a second time if he likes. If he plays optimally to obtain the greatest value, what is the expected value of his roll? | _____ 31. | Solve for x in the following:
$\log_2(x - 3) + \log_2(x - 5) = 3$ |
| _____ 16. | What is the 4 th natural number to have exactly three factors? | _____ 32. | Find the sum of the distinct zeros of $x^3 - x^2 - x + 1$. |
| | | _____ 33. | Find the value of 5.2^2 . |
| | | _____ 34. | Given $x + \frac{1}{x} = 3$, what is $(x + \frac{1}{x})^4$? |
| | | _____ 35. | How many socks can you pull from 2019 pairs of socks until you are guaranteed a match? |
| | | _____ 36. | In a single-elimination tournament of 2019 players, what is the number of total games played to find the winner? |
| | | _____ 37. | Which is larger: $\frac{2019!}{2017!}$ or $\frac{2021!}{2019!}$? |
| | | _____ 38. | Write $\frac{2}{101}$ as a repeating decimal. |
| | | _____ 39. | What is the sum of the digits of $100000 - 98765$? |
| | | _____ 40. | Find the sum of the squares of the first 8 Fibonacci numbers if the sequence begins 1,1,2,3,5... |