

Addition Made Complicated 8

Youth EUCLID

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🌲 0 Problems

1. What is $1 + \frac{2}{3+4/5}$?
(A) $\frac{10}{19}$ (B) $\frac{10}{7}$ (C) $\frac{29}{19}$ (D) $\frac{17}{7}$ (E) $\frac{43}{5}$
2. There are $3x$ cats and $4y$ dogs, where x and y are nonnegative integers. What is the largest integer number of pets such that a room with $3x$ cats and $4y$ dogs is not possible?
(A) 2 (B) 5 (C) 7 (D) 11 (E) 13
3. A cookie costs 5 dollars and a cupcake costs double that. How many pairs can you buy with 60 dollars assuming you buy the same amount of both items?
(A) 3 (B) 4 (C) 5 (D) 6 (E) 7
4. Ankan has 3 alts and is Evan's friend. djmathman has 39 alts and is also Evan's friend. Evan also has 239 OTIS students who are all his friends and from those, only 10 each have one alt who is also friends with Evan. Evan has no more AoPS friends. How many AoPS friends does Evan have? (Each alt counts as a different AoPS friend, and everyone mentioned has one 'main' account that is not an alt.)
(A) 289 (B) 291 (C) 293 (D) 295 (E) 297
5. Which of the following is the greatest?
(A) $\frac{15}{31}$ (B) $\frac{16}{33}$ (C) $\frac{17}{35}$ (D) $\frac{18}{37}$ (E) $\frac{19}{39}$
6. Four students sitting around a round table play a game, and each student is given a fruit: either an orange or an apple. In the game, a student with an orange must always tell the truth, and a student with an apple must always lie. Every student says, "The person on my right has an apple." How many of the four students have an orange?
(A) 0 (B) 1 (C) 2 (D) 3 (E) 4
7. Bob and Charlie have their ages sum up to 60. In 5 years, Bob's age will be 6 times Charlie's age. What is the absolute difference between their ages?
(A) 6 (B) 15 (C) 25 (D) 40 (E) 50
8. How many pairs of elements can be removed from the set 1, 2, 3, 4, 5, 6, 7, 8, 9 such that the average of the remaining 7 numbers remains the same as the original?
(A) 0 (B) 2 (C) 3 (D) 4 (E) 5
9. Using the symbol %, we say that $a\%b = 2 * a + 3 * b$. What is $(3\%4)\%5$?
(A) 49 (B) 51 (C) 57 (D) 61 (E) 64

10. I just spent \$90 to buy clothes. If a pair of socks costs \$1 each, a shirt costs \$4 each, and a pair of pants costs \$6 each, and I bought a total of 60 new items, how many socks did I just buy? Assume that I bought at least one of every clothing item.
(A) 5 (B) 21 (C) 36 (D) 44 (E) 52
11. The variables a, b, c, d are integers such that $2^a \cdot 3^b \cdot 5^c \cdot 7^d = 1800$, then what is the value of $a + b + c + d$?
(A) 4 (B) 5 (C) 6 (D) 7 (E) 8
12. How many ways are there to arrange 3 blue balls, 2 red balls, and 1 green ball? Balls of the same color are indistinguishable.
(A) 60 (B) 120 (C) 240 (D) 360 (E) 720
13. What is the tens digit of 7^{2023} ?
(A) 0 (B) 1 (C) 4 (D) 7 (E) 9
14. How many ways are there to split 10 (indivisible) donuts between 4 different kids?
(A) 126 (B) 286 (C) 364 (D) 715 (E) 1001
15. A trapezoid $ABCD$ has $\angle ABC = 135^\circ$ and $\angle BCD = 45^\circ$ and $\angle ADC = 90^\circ$. If $BC = 6$ and $AB = AD$, what is the area of the trapezoid?
(A) 18 (B) 24 (C) 27 (D) 30 (E) 36
16. In the 2020 Football₄Life conference, each team played every other team exactly twice. If a total of 72 games were played over the 2 week-long conference, how many teams were there?
(A) 8 (B) 9 (C) 12 (D) 36 (E) 72
17. The two numbers $\frac{27A45B1}{9}$ and $\frac{A22B9C3}{9}$ are both divisible by 9. What is the value of C ?
(A) 0 (B) 3 (C) 5 (D) 7 (E) 8
18. We are given integers a and b such that $a^3 + b^3$ is an odd number. If so, which of the following scenarios are possible?
(A) a and b are even (B) a and b are odd (C) $a + b$ is even (D) $a + b$ is odd (E) All of these are impossible
19. Suppose the game is as follows: I roll a 6-sided dice 3 times. You get 1 dollar if I roll a 1, 2 dollars if I roll a 2, 3 dollars if I roll a 3, and so on. How much would I need to set the entry fee for the game in order to have an expected 50 cent profit?
(A) 11 (B) 13 (C) 16 (D) 18 (E) 21
20. An equilateral triangle and a square have equal areas. Given that the perimeter of the square is 2, what is the perimeter of the triangle?
(A) $3^{-\frac{1}{4}}$ (B) $3^{\frac{1}{4}}$ (C) $3^{\frac{3}{4}}$ (D) 3 (E) $3^{\frac{5}{4}}$
21. From a standard 52-card deck, Alex draws 4 cards at random and without replacement. What is the numerator of the probability that he draws exactly three 5's, in simplest form?
(A) 48 (B) 96 (C) 192 (D) 240 (E) 384
22. A club tries to take a picture of their members every day in January in a rectangular formation. They also want to make sure that every day, there is a different number of students in every row. However, by January 17, they find themselves unable to do so. What is the smallest possible number of club members, assuming it never changes in January?
(A) 120 (B) 250 (C) 420 (D) 600 (E) 1080

23. A 16 by 30 rectangle is rotated 180° clockwise about its center. What is the total area swept out by this rectangle during the rotation?
(A) 256π (B) 289π (C) 900π (D) 1024π (E) 1156π
24. In quadrilateral $ABCD$ with $\overline{AC} \perp \overline{BD}$, we have $AB = 6$, $BC = 9$, $CD = 13$. What is AD^2 ?
(A) 52 (B) 81 (C) 124 (D) 214 (E) 286
25. Two points are placed at random on the same side of a square and a third is chosen at random on one of the other three sides. What is the probability they make an obtuse triangle?
(A) $1/2$ (B) $2/3$ (C) $4/5$ (D) $7/8$ (E) $8/9$

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Problem writers

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Testsolvers

Zachary Cheng, Catherine Li, Selena Ge, Neal Yan