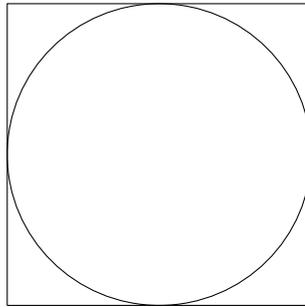


Pi Math Contest Euler Division

2022

1. What is $1 + 2 \times 3$?
2. How many multiples of 2 are between 1 and 9?
3. Anna is the 50th person in a line with 100 people. What is the positive difference between the number of people after her and the number of people before her?
4. What is
$$8 \times \left(\frac{1}{2} + \frac{1}{4} + \frac{1}{8} \right)?$$
5. Emily was born on March 14, 2017. How many years old was she on January 1, 2022?
6. The product of the digits of Alice's favorite two-digit number is 16. How many possibilities are there for Alice's favorite two-digit number?
7. A rectangle has a side of length 2 and a perimeter of 10. What is the area of this rectangle?
8. Ata exchanges 18 plastic bottles for 8 cents each. If he then exchanges as much of his money as possible for quarters, how many quarters will he have?

9. The problems on this test are numbered from 1 to 25. What percent of the problem numbers have two identical digits?
10. Compute the sum of the digits of 11^3 .
11. What is the greatest number of intersection points between a triangle and a circle?
12. What is the result when the least common multiple of 4 and 6 is divided by the greatest common factor of 4 and 6?
13. In the figure below, a circle is inscribed inside a square with side length 2. What is the area of the circle, to the nearest integer?



14. A room is in the shape of a rectangular prism. It has a base of 4.9 feet by 10.1 feet, and a volume of 201 cubic feet. What is the height of the room in feet, to the nearest integer?
15. Define the *awesomeness* of a number as the sum of all its positive integer divisors other than itself. For example, the awesomeness of 4 is $1 + 2 = 3$. Which positive digit has the largest awesomeness?
16. Triangle ABC is isosceles and angle B has a measure of 30 degrees. Candice computes the sum of the possible values of the degree measure of angle C . What is the sum of the digits of Candice's sum?

17. A triangle has area 8. A new triangle is formed by connecting the midpoints of the sides of the original triangle. What is the area of this new triangle?
18. The number $4096 = 2^{12}$ has 13 positive integer divisors: $1, 2, 2^2, 2^3, \dots, 2^{12}$. How many positive integers are there whose square divides 4096?
19. Helen flips a fair coin four times. How many possible sequences of flips do not have two consecutive tails?
20. Olivia thinks of a number. Her number is the number of divisors of 210 that are composite. What is the product of the digits of Olivia's number?
21. There are four people named Alice, Bob, Charlie, and Diane. For each person, there is a name tag with their name on it. How many ways can the four name tags be assigned to the four people such that each person gets one name tag and at least two people get their own?
22. The letters of the word EULER are arranged randomly. What is the reciprocal of the probability that the vowels appear in alphabetical order *and* the consonants appear in alphabetical order?
23. Ayesha thinks of a positive number. She subtracts three and takes the absolute value of the result. Then, she subtracts four from that and takes the absolute value of the result. She ends up with 2. How many possible numbers could Ayesha have started with?
Note: The absolute value of a number is the distance between that number and 0. For example, the absolute value of -2 is 2, because the distance between -2 and 0 is 2.
24. A *geometric sequence* is a sequence in which the ratio of successive terms is constant. For example, 1, 2, 4 is a geometric sequence. How many three-digit numbers with different digits have their digits form a geometric sequence when written in order?

25. Rohan draws three distinct circles on a piece of paper such that no circle touches an edge of the paper. Let N be the number of regions into which they divide the paper. For example, if he draws three non-intersecting circles, there would be four regions; inside the first circle, inside the second circle, inside the third circle, and outside all circles. How many possible values are there for N ?