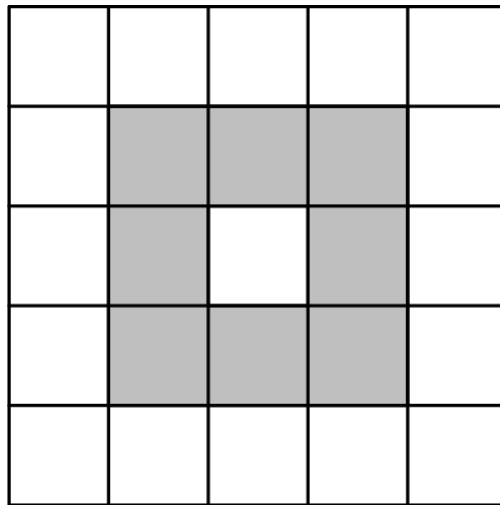
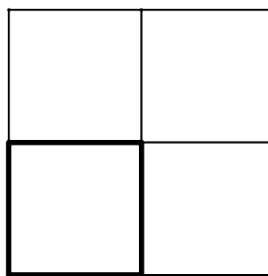
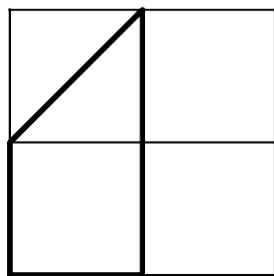
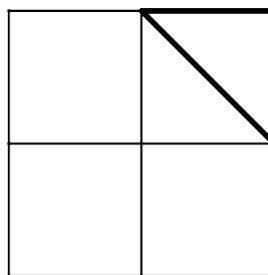
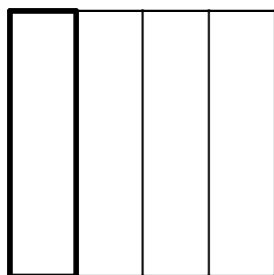


1. Margie bought 3 apples at a cost of 50 cents per apple. She paid with a 5-dollar bill. How much change did Margie receive?
2. Karl's rectangular vegetable garden is 20 feet by 45 feet, and Makenna's is 25 feet by 40 feet. How much larger in square feet is Makenna's garden than Karl's garden?
3. Extend the square pattern of 8 black and 17 white square tiles by attaching a border of black tiles around the square. What is the ratio of black tiles to white tiles in the extended pattern?



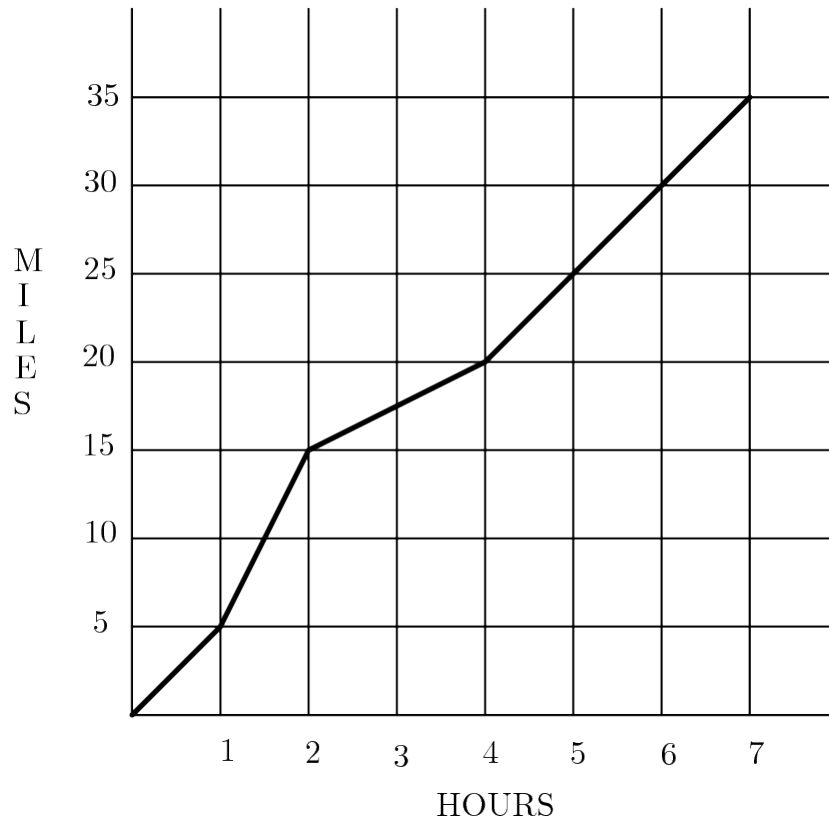
4. Here is a list of the numbers of fish that Tyler caught in nine outings last summer:
 $2, 0, 1, 3, 0, 3, 3, 1, 2.$
Which statement about the mean, median, and mode is true?
(A) median $<$ mean $<$ mode (B) mean $<$ mode $<$ median
(C) mean $<$ median $<$ mode (D) median $<$ mode $<$ mean
(E) mode $<$ median $<$ mean
5. What day and time will it 2022 minutes after midnight on January 1, 2022?

6. In a town of 351 adults, every adult owns a car, motorcycle, or both. If 331 adults own cars and 45 adults own motorcycles, how many of the car owners do not own a motorcycle?
7. Each of the following four large congruent squares is subdivided into combinations of congruent triangles or rectangles and is partially bolded. What percent of the total area is partially bolded?



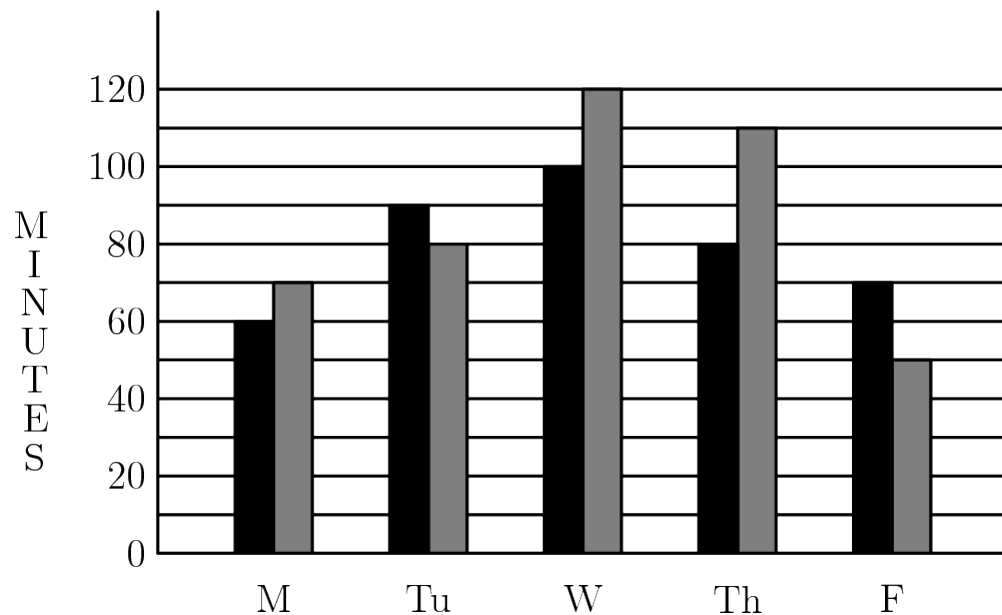
8. Angie, Bridget, Carlos, and Diego are seated at random around a square table, one person to a side. What is the probability that Angie and Carlos are seated opposite each other?
9. Bag A has three chips labeled 1, 3, and 5. Bag B has three chips labeled 2, 4, and 6. If one chip is drawn from each bag, how many different values are possible for the sum of the two numbers on the chips?

10. Carmen takes a long bike ride on a hilly highway. The graph indicates the miles traveled during the time of her ride. What is Carmen's average speed for her entire ride in miles per hour?



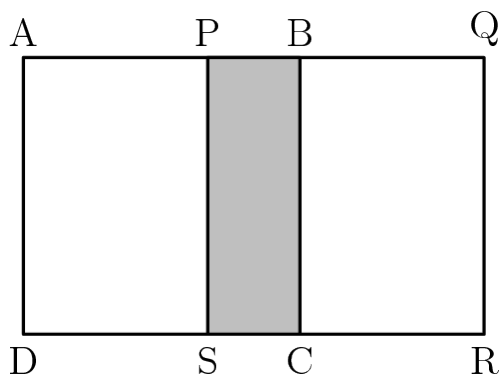
11. The taxi fare in Gotham City is \$2.40 for the first $\frac{1}{2}$ mile and additional mileage charged at the rate \$0.20 for each additional 0.1 mile. You plan to give the driver a \$2 tip. How many miles can you ride for \$10?

12. The graph shows the number of minutes studied by both Asha (black bar) and Sasha (grey bar) in one week. On the average, how many more minutes per day did Sasha study than Asha?



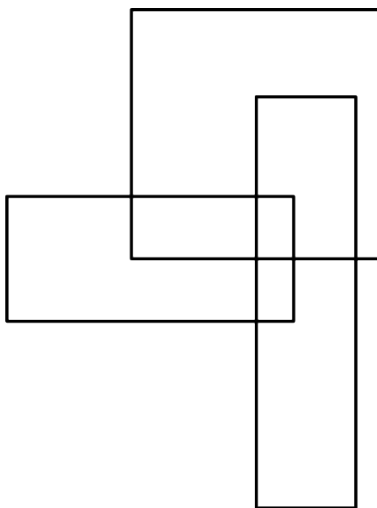
13. How many digits are in the product $4^5 \cdot 5^{10}$?
14. Let A be the area of the triangle with sides of length 25, 25, and 30. Let B be the area of the triangle with sides of length 25, 25, and 40. What is $A - B$?
15. Let w , x , y , and z be whole numbers. If $2^w \cdot 3^x \cdot 5^y \cdot 7^z = 588$, then what does $2w + 3x + 5y + 7z$ equal?

16. Two congruent squares, $ABCD$ and $PQRS$, have side length 15. They overlap to form the 15 by 25 rectangle $AQRD$ shown. What percent of the area of rectangle $AQRD$ is shaded? [

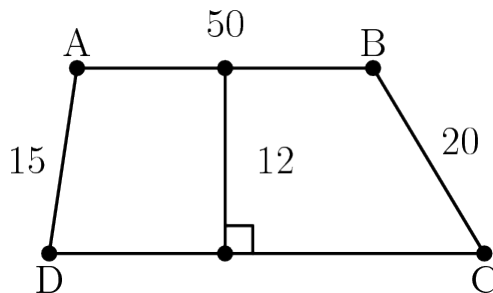


17. Students guess that Norb's age is 24, 28, 30, 32, 36, 38, 41, 44, 47, and 49. Norb says, "At least half of you guessed too low, two of you are off by one, and my age is a prime number." How old is Norb?
18. What is the tens digit of 7^{2011} ?
19. There are 270 students at Colfax Middle School, where the ratio of boys to girls is 5 : 4. There are 180 students at Winthrop Middle School, where the ratio of boys to girls is 4 : 5. The two schools hold a dance and all students from both schools attend. What fraction of the students at the dance are girls?

20. How many rectangles are in this figure?

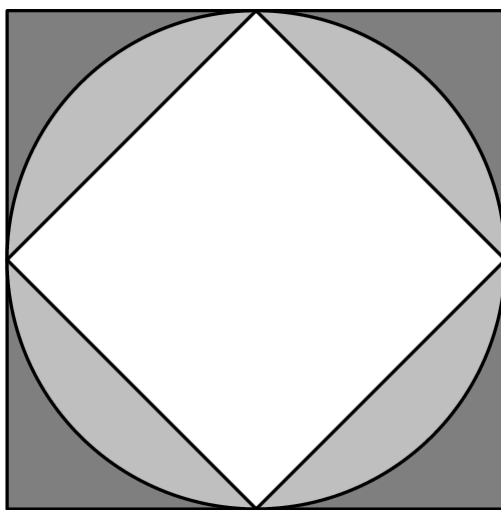


21. A fair 6-sided die is rolled twice. What is the probability that the first number that comes up is greater than or equal to the second number?
22. Quadrilateral $ABCD$ is a trapezoid, $AD = 15$, $AB = 50$, $BC = 20$, and the altitude is 12. What is the area of the trapezoid?



23. How many 4-digit positive integers have four different digits, where the leading digit is not zero, the integer is a multiple of 5, and 5 is the largest digit?

24. In how many ways can 10001 be written as the sum of two primes?
25. A circle with radius 1 is inscribed in a square and circumscribed about another square as shown. Which fraction is closest to the ratio of the circle's shaded area to the area between the two squares?



26. A small bottle of shampoo can hold 35 milliliters of shampoo, whereas a large bottle can hold 500 milliliters of shampoo. Jasmine wants to buy the minimum number of small bottles necessary to completely fill a large bottle. How many bottles must she buy?
27. Suppose $[a b]$ denotes the average of a and b , and $\{a b c\}$ denotes the average of a, b , and c . What is $\{\{1 1 0\} [0 1] 0\}$?
28. Let X and Y be the following sums of arithmetic sequences:

$$X = 10 + 12 + 14 + \cdots + 100,$$

$$Y = 12 + 14 + 16 + \cdots + 102.$$

What is the value of $Y - X$?

29. At an elementary school, the students in third grade, fourth grade, and fifth grade run an average of 12, 15, and 10 minutes per day, respectively. There are twice as many third graders as fourth graders, and twice as many fourth graders as fifth graders. What is the average number of minutes run per day by these students?
30. Set A has 20 elements, and set B has 15 elements. What is the smallest possible number of elements in $A \cup B$, the union of A and B ?
31. Last summer 30% of the birds living on Town Lake were geese, 25% were swans, 10% were herons, and 35% were ducks. What percent of the birds that were not swans were geese?
32. A rectangular region is bounded by the graphs of the equations $y = a$, $y = -b$, $x = -c$, and $x = d$, where a, b, c , and d are all positive numbers. Find the area of this region in terms of a, b, c, d .
33. A majority of the 30 students in Ms. Deameanor's class bought pencils at the school bookstore. Each of these students bought the same number of pencils, and this number was greater than 1. The cost of a pencil in cents was greater than the number of pencils each student bought, and the total cost of all the pencils was \$17.71. What was the cost of a pencil in cents?
34. The players on a basketball team made some three-point shots, some two-point shots, and some one-point free throws. They scored as many points with two-point shots as with three-point shots. Their number of successful free throws was one more than their number of successful two-point shots. The team's total score was 61 points. How many free throws did they make?
35. How many even integers are there between 200 and 700 whose digits are all different and come from the set $\{1, 2, 5, 7, 8, 9\}$?

36. A pair of standard 6-sided fair dice is rolled once. The sum of the numbers rolled determines the diameter of a circle. What is the probability that the numerical value of the area of the circle is less than the numerical value of the circle's circumference?
37. Express $\sqrt{9 - 6\sqrt{2}} + \sqrt{9 + 6\sqrt{2}}$ in the form $a\sqrt{b}$ where a and b are integers and b is square-free.
38. Letters A, B, C , and D represent four different digits selected from $0, 1, 2, \dots, 9$. If $(A + B)/(C + D)$ is an integer that is as large as possible, what is the value of $A + B$?
39. Eight congruent equilateral triangles, each of a different color, are used to construct a regular octahedron. How many distinguishable ways are there to construct the octahedron? (Two colored octahedrons are distinguishable if neither can be rotated to look just like the other.)
40. The median of the list $n, n+3, n+4, n+5, n+6, n+8, n+10, n+12, n+15$ is 10. What is the mean?
41. A number x is 2 more than the product of its reciprocal and its additive inverse. What is x ?
42. The sum of two numbers is S . Suppose 3 is added to each number and then each of the resulting numbers is doubled. What is the sum of the final two numbers?

43. Each of the nine circles in the diagram below contains a different positive integer. These integers are consecutive and the sum of numbers in all the circles on each of the seven lines is 23. The number in the circle at the top right corner is less than the number in the circle at the bottom right corner. Eight of the numbers have been erased. Restore them.

