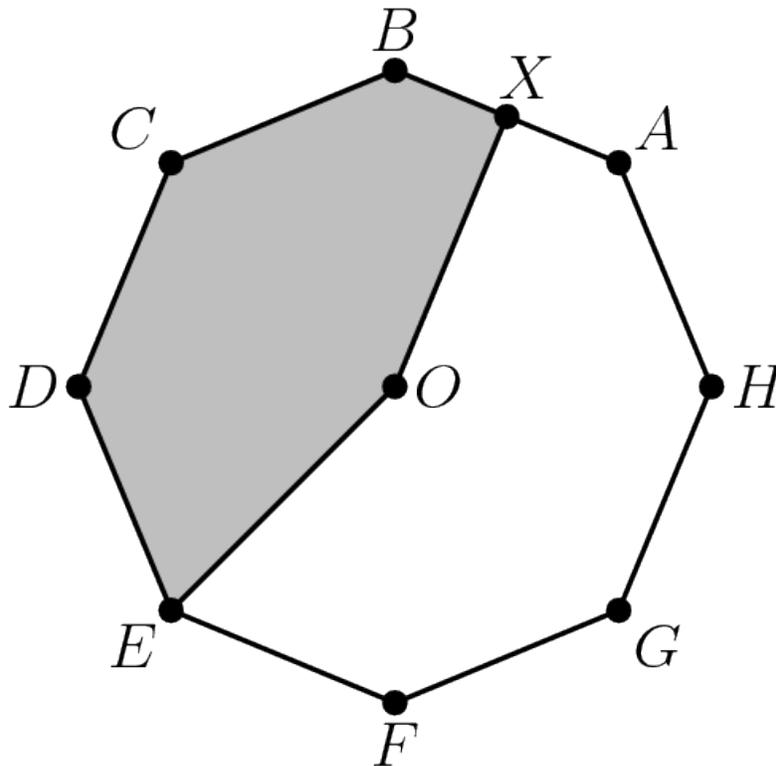


1. How many square yards of carpet are required to cover a rectangular floor that is 12 feet long and 9 feet wide? (There are 3 feet in a yard.)
2. Point O is the center of the regular octagon $ABCDEFGH$, and X is the midpoint of the side \overline{AB} . What fraction of the area of the octagon is shaded?



3. Jack and Jill are going swimming at a pool that is one mile from their house. They leave home simultaneously. Jill rides her bicycle to the pool at a constant speed of 10 miles per hour. Jack walks to the pool at a constant speed of 4 miles per hour. How many minutes before Jack does Jill arrive?

4. The Centerville Middle School chess team consists of two boys and three girls. A photographer wants to take a picture of the team to appear in the local newspaper. She decides to have them sit in a row with a boy at each end and the three girls in the middle. How many such arrangements are possible?

5. Billy's basketball team scored the following points over the course of the first 11 games of the season:

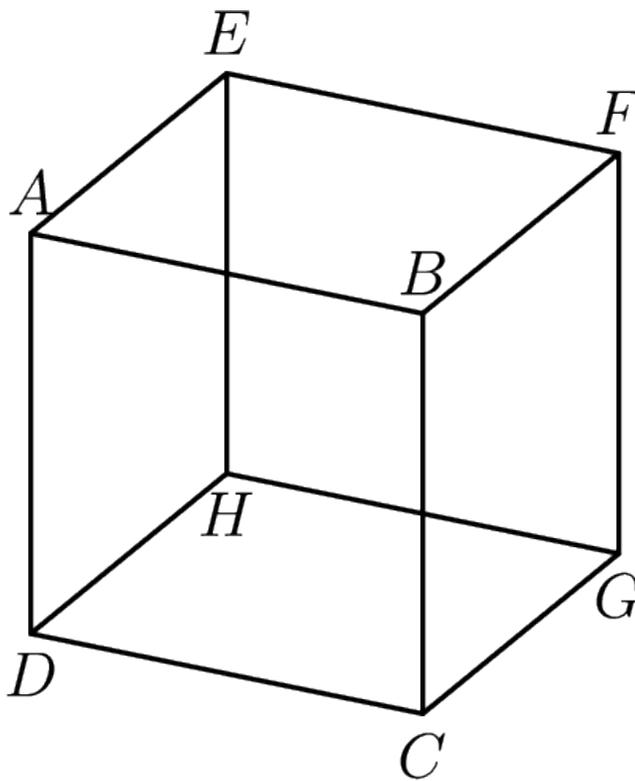
42, 47, 53, 53, 58, 58, 58, 61, 64, 65, 73

If his team scores 40 in the 12th game, which of the following statistics will show an increase?

(A) range (B) median (C) mean (D) mode (E) mid-range

6. In $\triangle ABC$, $AB = BC = 29$, and $AC = 42$. What is the area of $\triangle ABC$?
7. Each of two boxes contains three chips numbered 1, 2, 3. A chip is drawn randomly from each box and the numbers on the two chips are multiplied. What is the probability that their product is even?
8. What is the smallest whole number larger than the perimeter of any triangle with a side of length 5 and a side of length 19?
9. On her first day of work, Janabel sold one widget. On day two, she sold three widgets. On day three, she sold five widgets, and on each succeeding day, she sold two more widgets than she had sold on the previous day. How many widgets in total had Janabel sold after working 20 days?
10. How many integers between 1000 and 9999 have four distinct digits?

11. In the small country of Mathland, all automobile license plates have four symbols. The first must be a vowel ($A, E, I, O,$ or U), the second and third must be two different letters among the 21 non-vowels, and the fourth must be a digit (0 through 9). If the symbols are chosen at random subject to these conditions, what is the probability that the plate will read "AMC8"?
12. How many pairs of parallel edges, such as \overline{AB} , and \overline{GH} , or \overline{EH} , and \overline{FG} , does a cube have?



13. How many subsets of two elements can be removed from the set $\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11\}$ so that the mean (average) of the remaining numbers is 6?

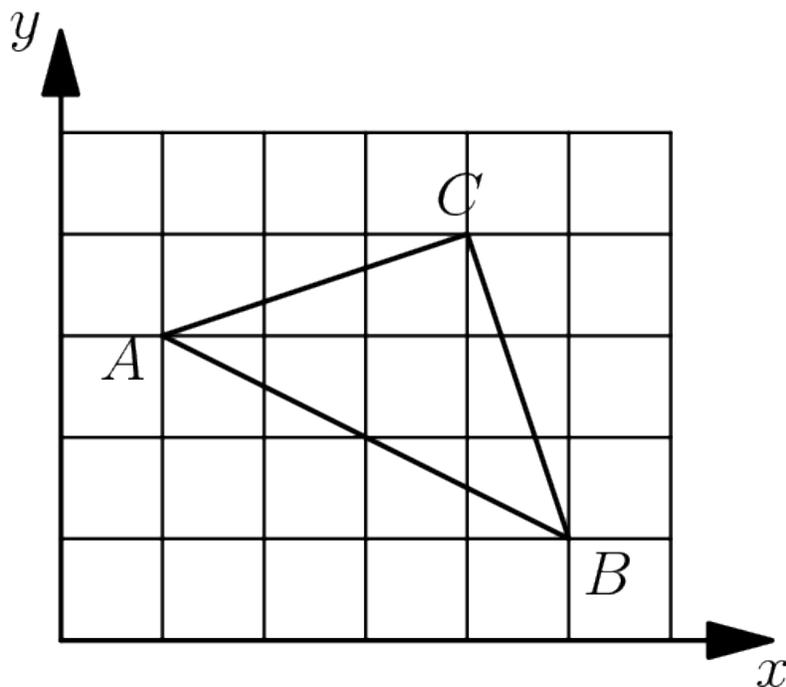
14. Which of the following integers cannot be written as the sum of four consecutive odd integers?
(A) 16 (B) 40 (C) 72 (D) 100 (E) 200
15. At Euler Middle School, 198 students voted on two issues in a school referendum with the following results: 149 voted in favor of the first issue and 119 voted in favor of the second issue. If there were exactly 29 students who voted against both issues, how many students voted in favor of both issues?
16. In a middle-school mentoring program, a number of the sixth graders are paired with a ninth-grade student as a buddy. No ninth grader is assigned more than one sixth-grade buddy. If $\frac{1}{3}$ of all the ninth graders are paired with $\frac{2}{5}$ of all the sixth graders, what fraction of the total number of sixth and ninth graders have a buddy?
17. Jeremy's father drives him to school in rush hour traffic in 20 minutes. One day there is no traffic, so his father can drive him 18 miles per hour faster and gets him to school in 12 minutes. How far in miles is it to school?

18. An arithmetic sequence is a sequence in which each term after the first is obtained by adding a constant to the previous term. For example, 2, 5, 8, 11, 14 is an arithmetic sequence with five terms, in which the first term is 2 and the constant added is 3. Each row and each column in this 5×5 array is an arithmetic sequence with five terms. The square in the center is labelled X as shown. What is the value of X ?

1				25
		X		
17				81

19. Ralph went to the store and bought 12 pairs of socks for a total of \$24. Some of the socks he bought cost \$1 a pair, some of the socks he bought cost \$3 a pair, and some of the socks he bought cost \$4 a pair. If he bought at least one pair of each type, how many pairs of \$1 socks did Ralph buy?

20. A triangle with vertices as $A = (1, 3)$, $B = (5, 1)$, and $C = (4, 4)$ is plotted on a 6×5 grid. What fraction of the grid is covered by the triangle?

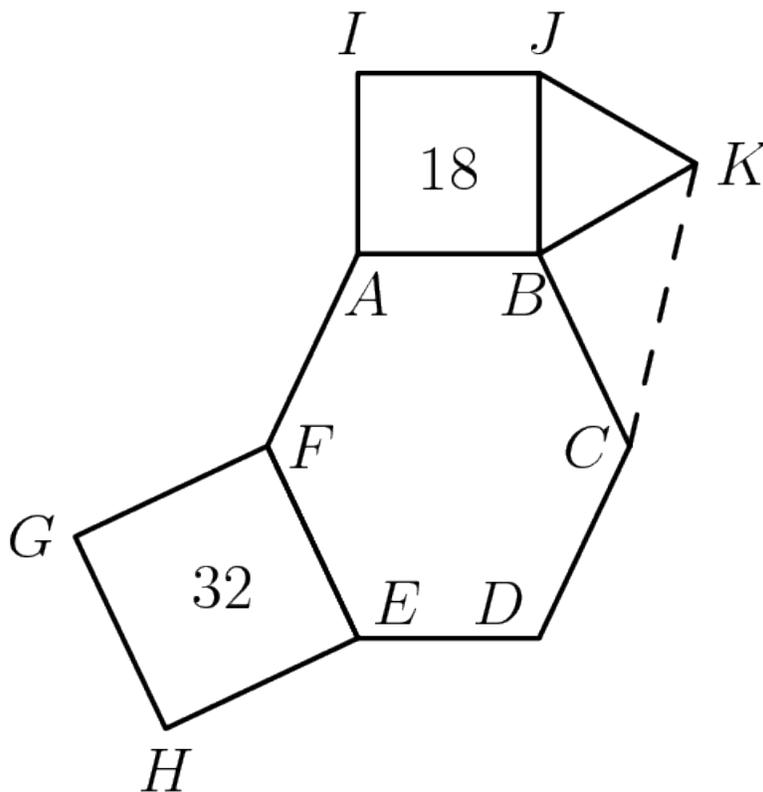


21. On June 1, a group of students are standing in rows, with 15 students in each row. On June 2, the same group is standing with all of the students in one long row. On June 3, the same group is standing with just one student in each row. On June 4, the same group is standing with 6 students in each row. This process continues through June 12 with a different number of students per row each day. However, on June 13, they cannot find a new way of organizing the students. What is the smallest possible number of students in the group?

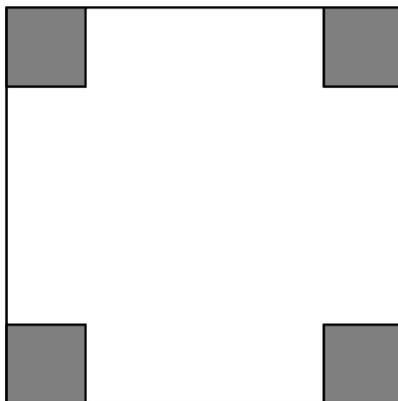
22. Tom has twelve slips of paper which he wants to put into five cups labeled A, B, C, D, E . He wants the sum of the numbers on the slips in each cup to be an integer. Furthermore, he wants the five integers to be consecutive and increasing from A to E . The numbers on the papers are 2, 2, 2, 2.5, 2.5, 3, 3, 3, 3, 3.5, 4, and 4.5. If a slip with 2 goes into cup E and a slip with 3 goes into cup B , then the slip with 3.5 must go into what cup?

(A) A (B) B (C) C (D) D (E) E

23. In the given figure hexagon $ABCDEF$ is equiangular, $ABJI$ and $FEHG$ are squares with areas 18 and 32 respectively, $\triangle JBK$ is equilateral and $FE = BC$. What is the area of $\triangle KBC$?

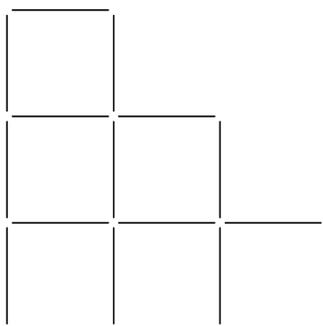


24. A baseball league consists of two four-team divisions. Each team plays every other team in its division N games. Each team plays every team in the other division M games with $N > 2M$ and $M > 4$. Each team plays a 76-game schedule. How many games does a team play within its own division?
25. One-inch squares are cut from the corners of this 5 inch square. What is the area in square inches of the largest square that can fit into the remaining space?



26. A box contains a collection of triangular and square tiles. There are 25 tiles in the box, containing 84 edges total. How many square tiles are there in the box?
27. Pablo, Sofia, and Mia got some candy eggs at a party. Pablo had three times as many eggs as Sofia, and Sofia had twice as many eggs as Mia. Pablo decides to give some of his eggs to Sofia and Mia so that all three will have the same number of eggs. What fraction of his eggs should Pablo give to Sofia?
28. Mr. Patrick teaches math to 15 students. He was grading tests and found that when he graded everyone's test except Payton's, the average grade for the class was 80. After he graded Payton's test, the test average became 81. What was Payton's score on the test?

29. The sum of two positive numbers is 5 times their difference. What is the ratio of the larger number to the smaller number?
30. Ann made a 3-step staircase using 18 toothpicks as shown in the figure. How many toothpicks does she need to add to complete a 5-step staircase?



31. How many terms are there in the arithmetic sequence 13, 16, 19, . . . , 70, 73?
32. Two years ago Pete was three times as old as his cousin Claire. 2 years before that, Pete was four times as old as Claire. In how many years will the ratio of their ages be 2 : 1?
33. How many rearrangements of $abcd$ are there in which no two adjacent letters are also adjacent letters in the alphabet? For example, no such rearrangements could include either ab or ba .
34. The ratio of the length to the width of a rectangle is 4 : 3. If the rectangle has diagonal of length d , then the area may be expressed as kd^2 for some constant k . What is k ?
35. Points $(\sqrt{\pi}, a)$ and $(\sqrt{\pi}, b)$ are distinct points on the graph of $y^2 + x^4 = 2x^2y + 1$. What is $|a - b|$?

36. For those high-flyers who have not used their 90 minutes, here's a puzzle to fill the rest of your time. This is not part of the course, but if I hear from you that you enjoyed this puzzle, I am willing to include such in each round. Four non-negative integers have been entered in the following 5×5 table. Fill in the remaining 21 spaces with positive integers so that the sum of all the numbers in each row and in each column is the same.

	82			
				79
		103		
0				