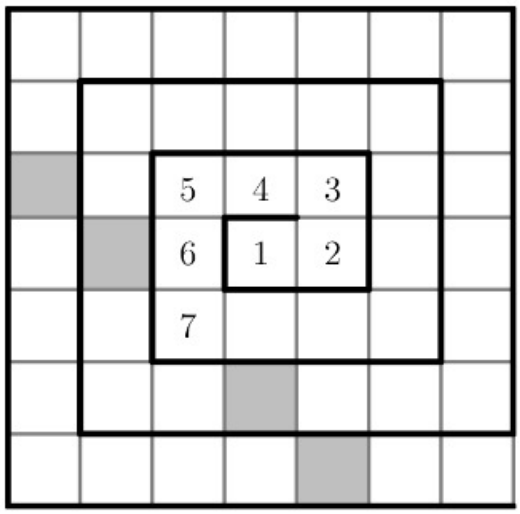
AMC 8 Combinatorics Questions - Year wise

Try these AMC 8 Combinatorics Questions and check your knowledge!

AMC 8, 2023, Problem 4

The numbers from 1 to 49 are arranged in a spiral pattern on a square grid, beginning at the center. The first few numbers have been entered into the grid below. Consider the four numbers that will appear in the shaded squares, on the same diagonal as the number 7 . How many of these four numbers are prime?



(A) 0
(B) 1
(C) 2
(D) 3
(E) 4

AMC 8, 2023, Problem 8

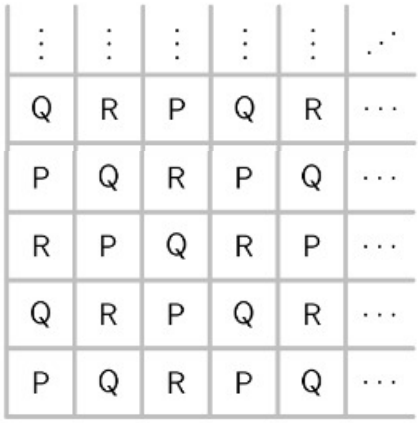
Lola, Lolo, Tiya, and Tiyo participated in a ping pong tournament. Each player competed against each of the other three players exactly twice. Shown below are the win-loss records for the players. The numbers 1 and 0 represent a win or loss, respectively. For example, Lola won five matches and lost the fourth match. What was Tiyo's win-loss record?

Player	Result
Lola	111011
Lolo	101010
Tiya	010100
Tiyo	??????

(A) 000101
(B) 001001
(C) 010000
(D) 010101
(E) 011000

AMC 8, 2023, Problem 16

The letters P, Q, and R are entered into a (20×20) table according to the pattern shown below. How many Ps, Qs, and Rs will appear in the completed table?



⋮	⋮	⋮	⋮	⋮	⋰
Q	R	P	Q	R	⋯
P	Q	R	P	Q	⋯
R	P	Q	R	P	⋯
Q	R	P	Q	R	⋯
P	Q	R	P	Q	⋯

(A) $(132\text{Ps}, 134\text{Qs}, 134\text{Rs})$
(B) $(133\text{Ps}, 133\text{Qs}, 134\text{Rs})$
(C) $(133\text{Ps}, 134\text{Qs}, 133\text{Rs})$
(D) $(134\text{Ps}, 132\text{Qs}, 134\text{Rs})$
(E) $(134\text{Ps}, 133\text{Qs}, 133\text{Rs})$

AMC 8, 2023, Problem 18

Greta Grasshopper sits on a long line of lily pads in a pond. From any lily pad, Greta can jump 5 pads to the right or 3 pads to the left. What is the fewest number of jumps Greta must make to reach the lily pad located 2023 pads to the right of her starting point?

(A) 405
(B) 407
(C) 409
(D) 411
(E) 413

AMC 8, 2023, Problem 21

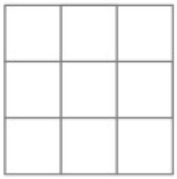
Alina writes the numbers (1,2, ..., 9) on separate cards, one number per card. She wishes to divide the cards into 3 groups of 3 cards so that the sum of the numbers in each group will be the same. In how many ways can this be done?

(A) 0
(B) 1
(C) 2
(D) 3
(E) 4

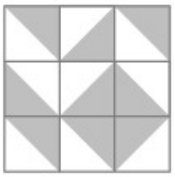
AMC 8, 2023, Problem 23

Each square in a (3×3) grid is randomly filled with one of the 4 gray and white tiles shown

below on the right.



What is the probability that the tiling will contain a large gray diamond in one of the smaller (2×2) grids? Below is an example of such tiling.



(A) $\frac{1}{1024}$

(B) $\frac{1}{256}$

(C) $\frac{1}{64}$

(D) $\frac{1}{16}$

(E) $\frac{1}{4}$

AMC 8, 2022, Problem 3

When three positive integers a, b,and c are multiplied together, their product is 100 . Suppose $a < b < c$. In how many ways can the numbers chosen?

(A) 0
(B) 1
(C) 2
(D) 3
(E) 4

AMC 8, 2022, Problem 14

In how many ways can the letters in BEEKEEPER be rearranged so that two or more Es do not appear together?

(A) 1
(B) 4
(C) 12
(D) 24
(E) 120

AMC 8, 2022, Problem 17

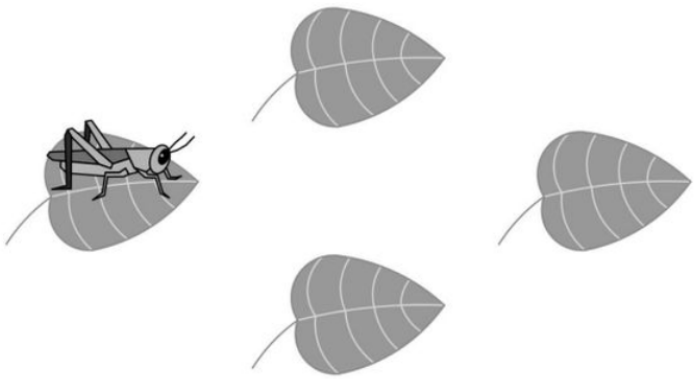
If n is an even positive integer, the double factorial notation $n!!$ represents the product of all the even integers from 2 to n. For example, $8!! = 2 \cdot 4 \cdot 6 \cdot 8$. What is the units digit of the following sum?

$2!! + 4!! + 6!! + \cdots + 2018!! + 2020!! + 2022!!$

(A) 0
(B) 2
(C) 4
(D) 6
(E) 8

AMC 8, 2022, Problem 25

A cricket randomly hops between 4 leaves, on each turn hopping to one of the other 3 leaves with equal probability. After 4 hops, what is the probability that the cricket has returned to the leaf where it started?



$(A)(\frac{2}{9})$

$(B)(\frac{19}{80})$

$(C)(\frac{20}{81})$

$(D)(\frac{1}{4})$

$(E)(\frac{7}{27})$

AMC 8, 2019, Problem 6

There are 81 grid points (uniformly spaced) in the square shown in the diagram below, including the points on the edges. Point P is in the center of the square. Given that point Q is randomly chosen among the other 80 points, what is the probability that the line PQ is a line of symmetry for the square?

(A) $\frac{1}{5}$ **(B)** $\frac{1}{4}$ **(C)** $\frac{2}{5}$ **(D)** $\frac{9}{20}$ **(E)** $\frac{1}{2}$

AMC 8, 2014, Problem 18

The faces of each of two fair dice are numbered $1, 2, 3, 5, 7$, and 8. When the two dice are tossed, what is the probability that their sum will be an even number?

(A) $\frac{4}{9}$ **(B)** $\frac{1}{2}$ **(C)** $\frac{5}{9}$ **(D)** $\frac{3}{5}$ **(E)** $\frac{2}{3}$

AMC 8, 2019, Problem 10

The diagram shows the number of students at soccer practice each weekday during last week. After computing the mean and median values, Coach discovers that there were actually 21 participants on Wednesday. Which of the following statements describes the change in the mean and median after the correction is made?

(A) The mean increases by 1 and the median does not change.

$\textbf{(B)}$ The mean increases by 1 and the median increases by 1.

$\textbf{(C)}$ The mean increases by 1 and the median increases by 5.

$\textbf{(D)}$ The mean increases by 5 and the median increases by 1.

$\textbf{(E)}$ The mean increases by 5 and the median increases by 5.

AMC 8, 2019, Problem 16

Qiang drives 15 miles at an average speed of 30 miles per hour. How many additional miles will he have to drive at 55 miles per hour to average 50 miles per hour for the entire trip?

AMC 8, 2019, Problem 19

In a tournament there are six teams that play each other twice. A team earns 3 points for a win, 1 point for a draw, and 0 points for a loss. After all the games have been played it turns out that the top three teams earned the same number of total points. What is the greatest possible number of total points for each of the top three teams?

$\textbf{(A)}$ 22 $\textbf{(B)}$ 23 $\textbf{(C)}$ 24 $\textbf{(D)}$ 26 $\textbf{(E)}$ 30

AMC 8, 2019, Problem 20

How many different real numbers x satisfy the equation$(x^2 - 5)^2 = 16$?
$\textbf{(A)}$ 0 $\textbf{(B)}$ 1 $\textbf{(C)}$ 2 $\textbf{(D)}$ 4 $\textbf{(E)}$ 8

AMC 8, 2019, Problem 25

Alice has 24 apples. In how many ways can she share them with Becky and Chris so that each of the people has at least 2 apples?

$\textbf{(A)}$ 105 $\textbf{(B)}$ 114 $\textbf{(C)}$ 190 $\textbf{(D)}$ 210 $\textbf{(E)}$ 380

AMC 8, 2019, Problem 14

Isabella has 6 coupons that can be redeemed for free ice cream cones at Pete's Sweet Treats. In order to make the coupons last, she decides that she will redeem one every 10 days until she has used them all. She knows that Pete's is closed on Sundays, but as she circles the 6 dates on her calendar, she realizes that no circled date falls on a Sunday. On what day of the week does Isabella redeem her first coupon?

$\textbf{(A)}$ Monday $\textbf{(B)}$ Tuesday $\textbf{(C)}$ Wednesday $\textbf{(D)}$ Thursday

AMC 8, 2019, Problem 18

The faces of each of two fair dice are numbered 1, 2, 3, 5, 7, and 8. When the two dice are tossed, what is the probability that their sum will be an even number?

$\textbf{(A)}\ \frac{4}{9}$ $\textbf{(B)}\ \frac{1}{2}$ $\textbf{(C)}\ \frac{5}{9}$ $\textbf{(D)}\ \frac{3}{5}$ $\textbf{(E)}\ \frac{2}{3}$

AMC 8, 2019, Problem 25

Alice has 24 apples. In how many ways can she share them with Becky and Chris so that each of the people has at least 2 apples?

$\textbf{(A)}\ 105$ $\textbf{(B)}\ 114$ $\textbf{(C)}\ 190$ $\textbf{(D)}\ 210$ $\textbf{(E)}\ 380$

AMC 8, 2018, Problem 11

Abby, Bridget, and four of their classmates will be seated in two rows of three for a group picture, as shown.

$$\begin{array}{ccc} \text{X} & \text{X} & \text{X} \\ \text{X} & \text{X} & \text{X} \end{array}$$

If the seating positions are assigned randomly, what is the probability that Abby and Bridget are adjacent to each other in the same row or the same column?

$\textbf{(A)}\ \frac{1}{3}$ $\textbf{(B)}\ \frac{2}{5}$ $\textbf{(C)}\ \frac{7}{15}$ $\textbf{(D)}\ \frac{1}{2}$ $\textbf{(E)}\ \frac{2}{3}$

AMC 8, 2018, Problem 16

Professor Chang has nine different language books lined up on a bookshelf: two Arabic, three German, and four Spanish. How many ways are there to arrange the nine books on the shelf keeping the Arabic books together and keeping the Spanish books together?

$\textbf{(A)}\ 1440$ $\textbf{(B)}\ 2880$ $\textbf{(C)}\ 5760$ $\textbf{(D)}\ 182,440$ $\textbf{(E)}\ 362,880$

AMC 8, 2018, Problem 19

n a sign pyramid a cell gets a "+" if the two cells below it have the same sign, and it gets a "-" if the two cells below it have different signs. The diagram below illustrates a sign pyramid with

four levels. How many possible ways are there to fill the four cells in the botto. produce a "+" at the top of the pyramid?

$\textbf{(A)}\ 2 \qquad \textbf{(B)}\ 4 \qquad \textbf{(C)}\ 8 \qquad \textbf{(D)}\ 12 \qquad \textbf{(E)}\ 16$

AMC 8, 2018, Problem 23

From a regular octagon, a triangle is formed by connecting three randomly chosen vertices of the octagon. What is the probability that at least one of the sides of the triangle is also a side of the octagon?

$\textbf{(A)}\ \frac{2}{7} \qquad \textbf{(B)}\ \frac{5}{42} \qquad \textbf{(C)}\ \frac{11}{14} \qquad \textbf{(D)}\ \frac{5}{7} \qquad \textbf{(E)}\ \frac{6}{7}$

AMC 8, 2017, Problem 10

A box contains five cards, numbered $1, 2, 3, 4$, and 5. Three cards are selected randomly without replacement from the box. What is the probability that 4 is the largest value selected?

$\textbf{(A)}\ \frac{1}{10} \qquad \textbf{(B)}\ \frac{1}{5} \qquad \textbf{(C)}\ \frac{3}{10} \qquad \textbf{(D)}\ \frac{2}{5} \qquad \textbf{(E)}\ \frac{1}{2}$

AMC 8, 2017, Problem 11

A square-shaped floor is covered with congruent square tiles. If the total number of tiles that lie on the two diagonals is 37, how many tiles cover the floor?

$\textbf{(A)}\ 148 \qquad \textbf{(B)}\ 324 \qquad \textbf{(C)}\ 361 \qquad \textbf{(D)}\ 1296 \qquad \textbf{(E)}\ 1369$

AMC 8, 2017, Problem 15

In the arrangement of letters and numerals below, by how many different paths can one spell AMC8? Beginning at the A in the middle, a path allows only moves from one letter to an adjacent (above, below, left, or right, but not diagonal) letter. One example of such a path is traced in the picture.

	8	C	8	
8	C	M	C	8
C	M	A	M	C
8	C	M	C	8
	8	C	8	

(A) 8

(B) 9

(C) 12

(D) 24

(E) 36

AMC 8, 2017, Problem 19

For any positive integer M, the notation $M!$ denotes the product of the integers 1 through M. What is the largest integer n for which 5^n is a factor of the sum $98! + 99! + 100!$?

$\textbf{(A)}\ 23 \qquad \textbf{(B)}\ 24 \qquad \textbf{(C)}\ 25 \qquad \textbf{(D)}\ 26 \qquad \textbf{(E)}\ 27$

AMC 8, 2016, Problem 13

Two different numbers are randomly selected from the set $-2, -1, 0, 3, 4, 5$ and multiplied together. What is the probability that the product is 0?

$\textbf{(A)}\ \frac{1}{6} \qquad \textbf{(B)}\ \frac{1}{5} \qquad \textbf{(C)}\ \frac{1}{4} \qquad \textbf{(D)}\ \frac{1}{3} \qquad \textbf{(E)}\ \frac{1}{2}$

AMC 8, 2016, Problem 17

]An ATM password at Fred's Bank is composed of four digits from 0 to 9, with repeated digits allowable. If no password may begin with the sequence $9, 1, 1$, then how many passwords are possible?

$\textbf{(A)}\ 30 \qquad \textbf{(B)}\ 7290 \qquad \textbf{(C)}\ 9000 \qquad \textbf{(D)}\ 9990 \qquad \textbf{(E)}\ 9999$

AMC 8, 2016, Problem 18

In an All-Area track meet, 216 sprinters enter a $100-$meter dash competition. The track has 6 lanes, so only 6 sprinters can compete at a time. At the end of each race, the five non-winners are eliminated, and the winner will compete again in a later race. How many races are needed to determine the champion sprinter?

$\textbf{(A)}\ 36 \qquad \textbf{(B)}\ 42 \qquad \textbf{(C)}\ 43 \qquad \textbf{(D)}\ 60 \qquad \textbf{(E)}\ 72$

AMC 8, 2016, Problem 21

A top hat contains 3 red chips and 2 green chips. Chips are drawn randomly, one at a time

without replacement, until all 3 of the reds are drawn or until both green chips What is the probability that the 3 reds are drawn?

$\textbf{(A)}\ \frac{3}{10} \qquad \textbf{(B)}\ \frac{2}{5} \qquad \textbf{(C)}\ \frac{1}{2} \qquad \textbf{(D)}\ \frac{3}{5} \qquad \textbf{(E)}\ \frac{7}{10}$

AMC 8, 2015, Problem 4

The Dragonvale 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?

$\textbf{(A)}\ 2 \qquad \textbf{(B)}\ 4 \qquad \textbf{(C)}\ 5 \qquad \textbf{(D)}\ 6 \qquad \textbf{(E)}\ 12$

AMC 8, 2015, Problem 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?

$\textbf{(A)}\ \frac{1}{9} \qquad \textbf{(B)}\ \frac{2}{9} \qquad \textbf{(C)}\ \frac{4}{9} \qquad \textbf{(D)}\ \frac{1}{2} \qquad \textbf{(E)}\ \frac{5}{9}$

AMC 8, 2015, Problem 11

In the small country of Icosahedrontopia, 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 "$AMC8$"?

$\textbf{(A)}\ \frac{1}{22,050} \qquad \textbf{(B)}\ \frac{1}{21,000} \qquad \textbf{(C)}\ \frac{1}{10,500} \qquad \textbf{(D)}\ \frac{1}{2,100} \qquad \textbf{(E)}\ \frac{1}{1,050}$

AMC 8, 2015, Problem 12

How many pairs of parallel edges, such as $\overline{AB}$ and $\overline{GH}$ or $\overline{EH}$ and $\overline{FG}$, does a cube have?

$\textbf{(A)}\ 6 \quad \textbf{(B)}\ 12 \quad \textbf{(C)}\ 18 \quad \textbf{(D)}\ 24 \quad \textbf{(E)}\ 36$

AMC 8, 2015, Problem 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 numb

$\textbf{(A)}\ 1 \qquad \textbf{(B)}\ 2 \qquad \textbf{(C)}\ 3 \qquad \textbf{(D)}\ 5 \qquad \textbf{(E)}\ 6$

AMC 8, 2015, Problem 1

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. What is the value of X?

$\textbf{(A)}\ 21 \qquad \textbf{(B)}\ 31 \qquad \textbf{(C)}\ 36 \qquad \textbf{(D)}\ 40 \qquad \textbf{(E)}\ 42$

AMC 8, 2015, Problem 23

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?

$\textbf{(A)}\ A \qquad \textbf{(B)}\ B \qquad \textbf{(C)}\ C \qquad \textbf{(D)}\ D \qquad \textbf{(E)}\ E$

AMC 8, 2014, Problem 12

A magazine printed photos of three celebrities along with three photos of the celebrities as babies. The baby pictures did not identify the celebrities. Readers were asked to match each celebrity with the correct baby pictures. What is the probability that a reader guessing at random will match all three correctly?

$\textbf{(A)}\ \frac{1}{9} \qquad \textbf{(B)}\ \frac{1}{6} \qquad \textbf{(C)}\ \frac{1}{4} \qquad \textbf{(D)}\ \frac{1}{3} \qquad \textbf{(E)}\ \frac{1}{2}$

AMC 8, 2014, Problem 14

The "Middle School Eight" basketball conference has 8 teams. Every season, each team plays every other conference team twice (home and away), and each team also plays 4 games against non-conference opponents. What is the total number of games in a season involving the "Middle School Eight" teams?

$\textbf{(A)}\ 60 \qquad \textbf{(B)}\ 88 \qquad \textbf{(C)}\ 96 \qquad \textbf{(D)}\ 144 \qquad \textbf{(E)}\ 160$

AMC 8, 2013, Problem 1

Danica wants to arrange her model cars in rows with exactly 6 cars in each row. She now has 23 model cars. What is the smallest number of additional cars she must buy in order to be able to arrange all her cars this way?

$\textbf{(A)}\ 1 \qquad \textbf{(B)}\ 2 \qquad \textbf{(C)}\ 3 \qquad \textbf{(D)}\ 4 \qquad \textbf{(E)}\ 5$

AMC 8, 2013, Problem 8

A fair coin is tossed 3 times. What is the probability of at least two consecutive heads?

$\textbf{(A)}\ \frac{1}{8} \qquad \textbf{(B)}\ \frac{1}{4} \qquad \textbf{(C)}\ \frac{3}{8} \qquad \textbf{(D)}\ \frac{1}{2} \qquad \textbf{(E)}\ \frac{3}{4}$

AMC 8, 2013, Problem 14

Abe holds 1 green and 1 red jelly bean in his hand. Bob holds 1 green, 1 yellow, and 2 red jelly beans in his hand. Each randomly picks a jelly bean to show the other. What is the probability that the colors match?

$\textbf{(A)}\ \frac{1}{4} \qquad \textbf{(B)}\ \frac{1}{3} \qquad \textbf{(C)}\ \frac{3}{8} \qquad \textbf{(D)}\ \frac{1}{2} \qquad \textbf{(E)}\ \frac{2}{3}$

AMC 8, 2013, Problem 22

Toothpicks are used to make a grid that is 60 toothpicks long and 32 toothpicks wide. How many toothpicks are used altogether?

$\textbf{(A)}\ 1920 \qquad \textbf{(B)}\ 1952 \qquad \textbf{(C)}\ 1980 \qquad \textbf{(D)}\ 2013 \qquad \textbf{(E)}\ 3932$

AMC 8, 2012, Problem 10

How many 4-digit numbers greater than 1000 are there that use the four digits of 2012?

$\textbf{(A)}\ 6 \qquad \textbf{(B)}\ 7 \qquad \textbf{(C)}\ 8 \qquad \textbf{(D)}\ 9 \qquad \textbf{(E)}\ 12$

AMC 8, 2012, Problem 16

Each of the digits $0, 1, 2, 3, 4, 5, 6, 7, 8$, and 9 is used only once to make two five-digit numbers so that they have the largest possible sum. Which of the following could be one of the numbers?

$\textbf{(A)}\ 76531 \qquad \textbf{(B)}\ 86724 \qquad \textbf{(C)}\ 87431 \qquad \textbf{(D)}\ 96240 \qquad \textbf{(E)}\ 97403$

AMC 8, 2012, Problem 22

Let R be a set of nine distinct integers. Six of the elements are $2, 3, 4, 6, 9$, and 14. What is number of possible values of the median of R ?

$\textbf{(A)}\ 4 \qquad \textbf{(B)}\ 5 \qquad \textbf{(C)}\ 6 \qquad \textbf{(D)}\ 7 \qquad \textbf{(E)}\ 8$

AMC 8, 2011, Problem 8

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?

$\textbf{(A)}\ 4 \qquad \textbf{(B)}\ 5 \qquad \textbf{(C)}\ 6 \qquad \textbf{(D)}\ 7 \qquad \textbf{(E)}\ 9$

AMC 8, 2011, Problem 12

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?

$\textbf{(A)}\ \frac{1}{4} \qquad \textbf{(B)}\ \frac{1}{3} \qquad \textbf{(C)}\ \frac{1}{2} \qquad \textbf{(D)}\ \frac{2}{3} \qquad \textbf{(E)}\ \frac{3}{4}$

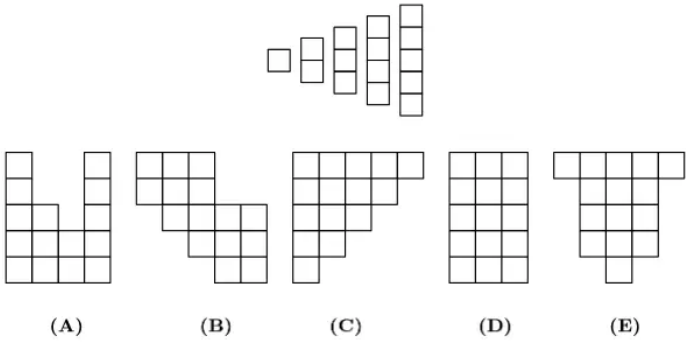
AMC 8, 2011, Problem 18

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?

$\textbf{(A)}\ \frac{1}{6} \qquad \textbf{(B)}\ \frac{5}{12} \qquad \textbf{(C)}\ \frac{1}{2} \qquad \textbf{(D)}\ \frac{7}{12} \qquad \textbf{(E)}\ \frac{5}{6}$

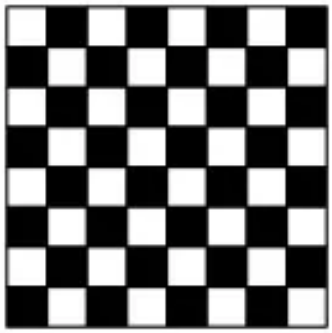
AMC 8, 2009, Problem 4

The five pieces shown below can be arranged to form four of the five figures shown in the choices. Which figure cannot be formed?



AMC 8, 2009, Problem 10

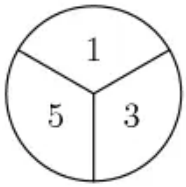
On a checkerboard composed of 64 unit squares, what is the probability that a randomly chosen unit square does not touch the outer edge of the board?

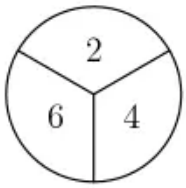


(A) $\frac{1}{16}$ **(B)** $\frac{7}{16}$ **(C)** $\frac{1}{2}$ **(D)** $\frac{9}{16}$ **(E)** $\frac{49}{64}$

AMC 8, 2009, Problem 12

The two spinners shown are spun once and each lands on one of the numbered sectors. What is the probability that the sum of the numbers in the two sectors is prime?





(A) $\frac{1}{2}$
(B) $\frac{2}{3}$
(C) $\frac{3}{4}$
(D) $\frac{7}{9}$
(E) $\frac{5}{6}$

AMC 8, 2009, Problem 13

A three-digit integer contains one of each of the digits 1, 3, and 5. What is the probability that

the integer is divisible by 5?

$\textbf{(A)}\ \frac{1}{6} \qquad \textbf{(B)}\ \frac{1}{3} \qquad \textbf{(C)}\ \frac{1}{2} \qquad \textbf{(D)}\ \frac{2}{3} \qquad \textbf{(E)}\ \frac{5}{6}$

AMC 8, 2009, Problem 16

How many 3 -digit positive integers have digits whose product equals 24?

(A) 12

(B) 15

(C) 18

(D) 21

(E) 24

AMC 8, 2009, Problem 19

Two angles of an isosceles triangle measure 70° and x°. What is the sum of the three possible values of x ?

(A) 95

(B) 125

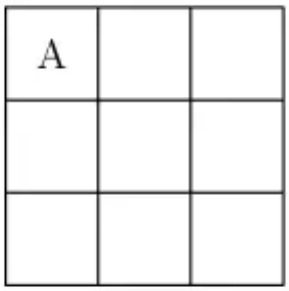
(C) 140

(D) 165

(E) 180

AMC 8, 2008, Problem 14

Three A's, three B 's, and three C's are placed in the nine spaces so that each row and column contain one of each letter. If A is placed in the upper left corner, how many arrangements are possible?



(A) 2 (B) 3 (C) 4

(D) 5 (E) 6

AMC 8, 2009, Problem 15

In Theresa's first 8 basketball games, she scored 7, 4, 3, 6, 8, 3, 1 and 5 points. game, she scored fewer than 10 points and her points-per-game average for the n was an integer. Similarly in her tenth game, she scored fewer than 10 points and her p game average for the 10 games was also an integer. What is the product of the number of points she scored in the ninth and tenth games?

(A) 35
(B) 40
(C) 48
(D) 56
(E) 72

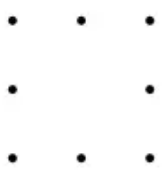
AMC 8, 2009, Problem 17

Ms. Osborne asks each student in her class to draw a rectangle with integer side lengths and a perimeter of 50 units. All of her students calculate the area of the rectangle they draw. What is the difference between the largest and smallest possible areas of the rectangles?

(A) 76
(B) 120
(C) 128
(D) 132
(E) 136

AMC 8, 2009, Problem 19

Eight points are spaced around at intervals of one unit around a 2×2 square, as shown. Two of the 8 points are chosen at random. What is the probability that the two points are one unit apart?



(A) $\frac{1}{4}$
(B) $\frac{2}{7}$
(C) $\frac{4}{11}$
(D) $\frac{1}{2}$
(E) $\frac{4}{7}$

AMC 8, 2009, Problem 20

The students in Mr. Neatkin's class took a penmanship test. Two-thirds of the boys and the girls passed the test, and an equal number of boys and girls passed the test. What is the minimum possible number of students in the class?

(A) 12
(B) 17
(C) 24
(D) 27
(E) 36

AMC 8, 2009, Problem 24

Ten tiles numbered 1 through 10 are turned face down. One tile is turned up at random, and a die is rolled. What is the probability that the product of the numbers on the tile and the die will be a square?

(A) $\frac{1}{10}$
(B) $\frac{1}{6}$
(C) $\frac{11}{60}$
(D) $\frac{1}{5}$
(E) $\frac{7}{30}$

AMC 8, 2007, Problem 4

A haunted house has six windows. In how many ways can Georgie the Ghost enter the house by one window and leave by a different window?

(A) 12
(B) 15
(C) 18
(D) 30
(E) 36

AMC 8, 2007, Problem 5

Chandler wants to buy a mountain bike. For his birthday, his grandparents send him , his aunt sends him and his cousin gives him . He earns per week for his paper route. He will use all of his birthday money and all of the money he earns from his paper route. In

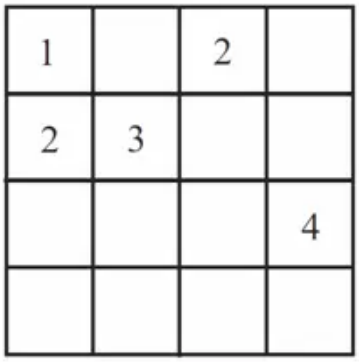
how many weeks will he be able to buy the mountain bike?

(A) 24
(B) 25
(C) 26
(D) 27

(E) 28

AMC 8, 2009, Problem 9

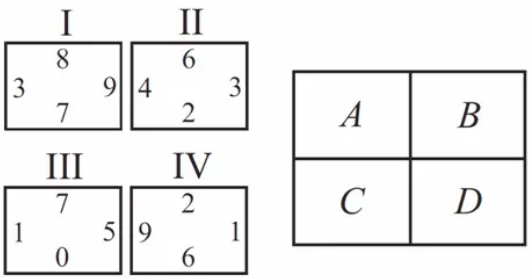
To complete the grid below, each of the digits 1 through 4 must occur once in each row and once in each column. What number will occupy the lower right-hand square?



(A) 1
(B) 2
(C) 3
(D) 4
(E) cannot be determined

AMC 8, 2007, Problem 11

Tiles I, II, III and IV are translated so one tile coincides with each of the rectangles A, B, C and D. In the final arrangement, the two numbers on any side common to two adjacent tiles must be the same. Which of the tiles is translated to Rectangle C?



(A) I

(B) II

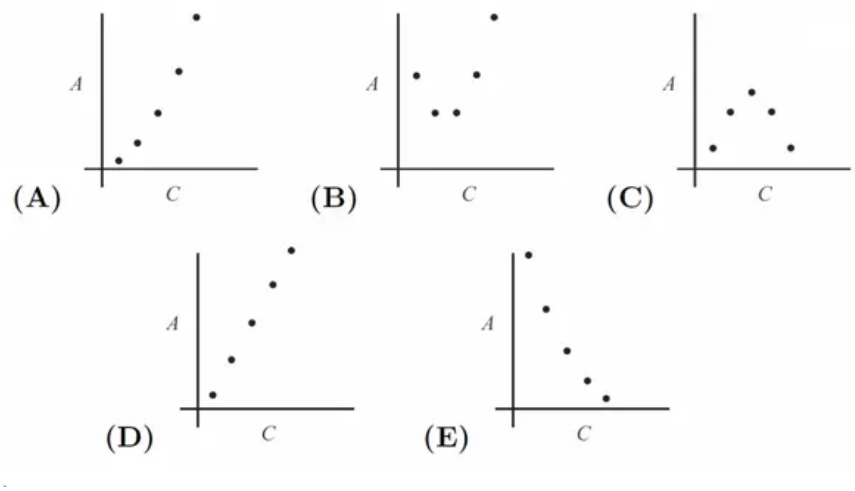
(C) III

(D) IV

(E) cannot be determined

AMC 8, 2009, Problem 16

Amanda draws five circles with radii $1, 2, 3, 4$ and 5 . Then for each circle she plots the point (C, A), where C is its circumference and A is its area. Which of the following could be her graph?



AMC 8, 2007, Problem 20

Before district play, the Unicorns had won 45% of their basketball games. During district play, they won six more games and lost two, to finish the season having won half their games. How many games did the Unicorns play in all?

(A) 48

(B) 50

(C) 52

(D) 54

(E) 60

AMC 8, 2007, Problem 21

Two cards are dealt from a deck of four red cards labeled A, B, C, D and four [illegible] labeled A, B, C, D. A winning pair is two of the same color or two of the same le[illegible] the probability of drawing a winning pair?

(A) $\frac{2}{7}$
(B) $\frac{3}{8}$
(C) $\frac{1}{2}$
(D) $\frac{4}{7}$
(E) $\frac{5}{8}$

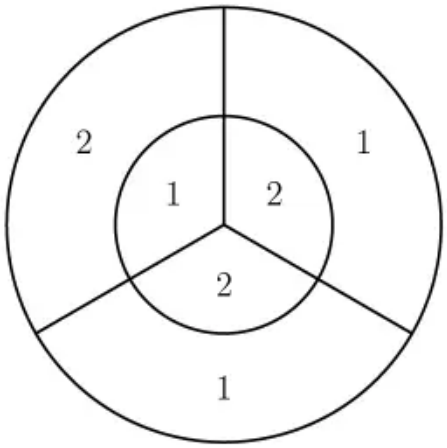
AMC 8, 2007, Problem 24

A bag contains four pieces of paper, each labeled with one of the digits //1, 2, 3// or //4//, with no repeats. Three of these pieces are drawn, one at a time without replacement, to construct a three-digit number. What is the probability that the three-digit number is a multiple of 3 ?

(A) $\frac{1}{4}$
(B) $\frac{1}{3}$
$(C) \frac{1}{2}$
(D) $\frac{2}{3}$
(E) $\frac{3}{4}$

AMC 8, 2007, Problem 25

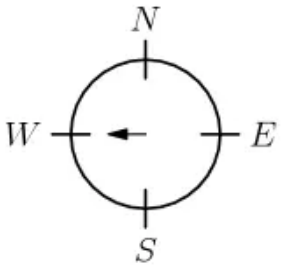
On the dart board shown in the Figure, the outer circle has radius 6 and the inner circle has a radius of 3 . Three radii divide each circle into three congruent regions, with point values shown. The probability that a dart will hit a given region is proportional to the area of the region. When two darts hit this board, the score is the sum of the point values in the regions. What is the probability that the score is odd?



(A) $\frac{17}{36}$
(B) $\frac{35}{72}$
(C) $\frac{1}{2}$
(D) $\frac{37}{72}$
(E) $\frac{19}{36}$

AMC 8, 2006, Problem 4

Initially, a spinner points west. Chenille moves it clockwise $2\frac{1}{4}$ revolutions and then counterclockwise $3\frac{3}{4}$ revolutions. In what direction does the spinner point after the two moves?



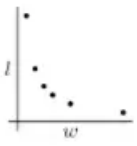
(A) north
(B) east

(C) south
(D) west
(E) northwest

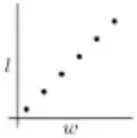
AMC 8, 2006, Problem 10

Jorge's teacher asks him to plot all the ordered pairs (w, l) of positive integers for which w is the width and l is the length of a rectangle with area 12. What should his graph look like?

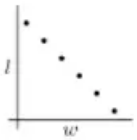
(A)



(B)

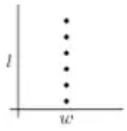


(C)



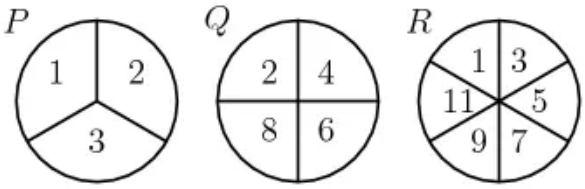
(D)

(E)



AMC 8, 2006, Problem 17

Jeff rotates spinners P, Q and R and adds the resulting numbers. What is the probability that his sum is an odd number?



(A) $\frac{1}{4}$
(B) $\frac{1}{3}$
(C) $\frac{1}{2}$
(D) $\frac{2}{3}$
(E) $\frac{3}{4}$

AMC 8, 2006, Problem 20

A singles tournament had six players. Each player played every other player only once, with no ties. If Helen won 4 games, Ines won 3 games, Janet won 2 games, Kendra won 2 games and Lara won 2 games, how many games did Monica (the sixth player) win?

(A) 0
(B) 1
(C) 2
(D) 3
(E) 4

AMC 8, 2006, Problem 21

An aquarium has a rectangular base that measures 100 cm by 40 cm and has a height of 50cm

. The aquarium is filled with water to a depth of 37 cm. A rock with volume 1ℓ placed in the aquarium and completely submerged. By how many centimeters doe level rise?

(A) 0.25

(B) 0.5

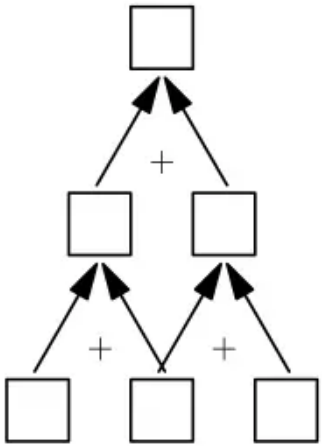
(C) 1

(D) 1.25

(E) 2.5

AMC 8, 2006, Problem 22

Three different one-digit positive integers are placed in the bottom row of cells. Numbers in adjacent cells are added and the sum is placed in the cell above them. In the second row, continue the same process to obtain a number in the top cell. What is the difference between the largest and smallest numbers possible in the top cell?



(A) 16

(B) 24

(C) 25

(D) 26

(E) 35

AMC 8, 2006, Problem 23

A box contains gold coins. If the coins are equally divided among six people, four coins are left over. If the coins are equally divided among five people, three coins are left over. If the box holds the smallest number of coins that meets these two conditions, how many coins are left when equally divided among seven people?

(A) 0
(B) 1
(C) 2
(D) 3
(E) 5

AMC 8, 2006, Problem 24

In the multiplication problem below A, B, C, D and are different digits. What is $A + B$?

$$\begin{array}{cccc} & A & B & A \\ \times & & C & D \\ \hline C & D & C & D \end{array}$$

(A) 1
(B) 2
(C) 3
(D) 4
(E) 9

AMC 8, 2005, Problem 20

Alice and Bob play a game involving a circle whose circumference is divided by 12 equally spaced points. The points are numbered clockwise, from 1 to 12. Both start on point 12 . Alice moves clockwise and Bob, counterclockwise. In a turn of the game, Alice moves 5 points clockwise and Bob moves 9 points counterclockwise. The game ends when they stop on the same point. How many turns will this take?
(A) 6
(B) 8
(C) 12
(D) 14
(E) 24

AMC 8, 2005, Problem 21

How many distinct triangles can be drawn using three of the dots below as vertices?
(A) 9
(B) 12

(C) 18
(D) 20
(E) 24

AMC 8, 2005, Problem 22

A company sells detergent in three different sized boxes: small (S), medium (M) and large (L). The medium size costs 50% more than the small size and contains 20% less detergent than the large size. The large size contains twice as much detergent as the small size and costs 30% more than the medium size. Rank the three sizes from best to worst buy.
(A) SML
(B) LMS
(C) MSL
(D) LSM
(E) MLS

AMC 8, 2005, Problem 24

A certain calculator has only two keys $[+1]$ and $[x2]$. When you press one of the keys, the calculator automatically displays the result. For instance, if the calculator originally displayed //9// and you pressed $[+1]$, it would display //10.// If you then pressed $[x2]$, it would display //20.// Starting with the display //1,// what is the fewest number of keystrokes you would need to reach //200//?
(A) 8
(B) 9
(C) 10
(D) 11
(E) 12

AMC 8, 2004, Problem 4

Ms. Hamilton's eighth-grade class wants to participate in the annual three-person-team basketball tournament. Lance, Sally, Joy, and Fred are chosen for the team. In how many ways can the three starters be chosen?
(A) 2
(B) 4
(C) 6

(D) 8
(E) 10

AMC 8, 2004, Problem 5

Ms. Hamilton's eighth-grade class wants to participate in the annual three-person-team basketball tournament. The losing team of each game is eliminated from the tournament. If sixteen teams compete, how many games will be played to determine the winner?
(A) 4
(B) 7
(C) 8
(D) 15
(E) 16

AMC 8, 2004, Problem 13

Amy, Bill and Celine are friends with different ages. Exactly one of the following statements is true.
I. Bill is the oldest.
II. Amy is not the oldest.
III. Celine is not the youngest.
Rank the friends from the oldest to the youngest.
(A) Bill, Amy, Celine
(B) Amy, Bill, Celine
(C) Celine, Amy, Bill
(D) Celine, Bill, Amy
(E) Amy, Celine, Bill

AMC 8, 2004, Problem 17

Three friends have a total of 6 identical pencils, and each one has at least one pencil. In how many can this happen?
(A) 1
(B) 3
(C) 6
(D) 10
(E) 12

AMC 8, 2004, Problem 18

Five friends compete in a dart-throwing contest. Each one has two darts to throw at a circular target, and each individual's score is the sum of the scores in the target regions that are hit. The scores for the target regions are the whole numbers 1 through 10. Each throw hits the target in a region with a different value. The scores are Alice 16 points, Ben 4 points, Cindy 7 points, Dave 11 points, and Ellen 17 points. Who hits the region worth 6 points?

(A) Alice

(B) Ben

(C) Cindy

(D) Dave

(E) Ellen

AMC 8, 2004, Problem 20

Two-thirds of the people in a room are seated in three-fourths of the chairs. The rest of the people are standing. If there are 6 empty chairs, how many people are in the room?

(A) 12

(B) 18

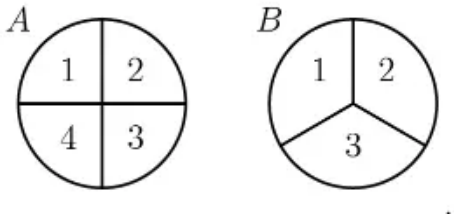
(C) 24

(D) 27

(E) 36

AMC 8, 2004, Problem 21

Spinners A and B are spun. On each spinner, the arrow is equally likely to land on each number. What is the probability that the product of the two spinners' numbers is even?

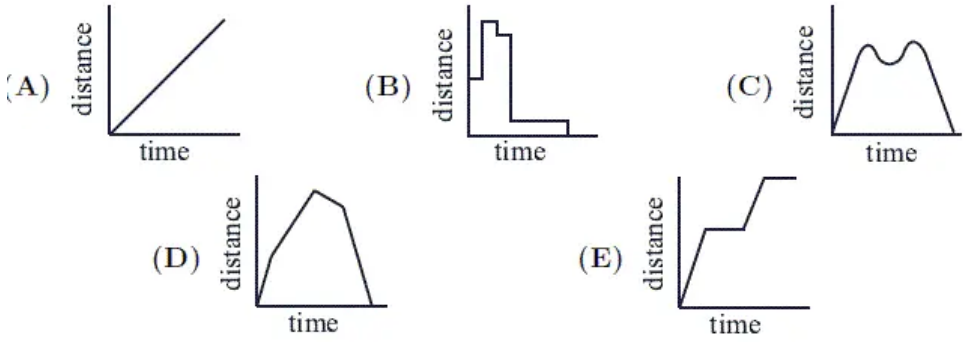


(A) $\frac{1}{4}$ (B) $\frac{1}{3}$ (C) $\frac{1}{2}$ (D) $\frac{2}{3}$

(E) $\frac{3}{4}$

AMC 8, 2004, Problem 23

Tess runs counterclockwise around rectangular block $JKLM$. She lives at co graph could represent her straight-line distance from home?



AMC 8, 2003, Problem 12

When a fair six-sided die is tossed on a table top, the bottom face cannot be seen. What is the probability that the product of the numbers on the five faces that can be seen is divisible by 6?

(A) $\frac{1}{3}$

(B) $\frac{1}{2}$

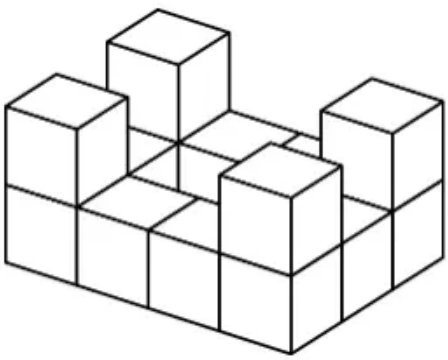
(C) $\frac{2}{3}$

(D) $\frac{5}{6}$

(E) 1

AMC 8, 2003, Problem 13

Fourteen white cubes are put together to form the figure on the right. The complete surface of the figure, including the bottom, is painted red. The figure is then separated into individual cubes. How many of the individual cubes have exactly four red faces?



(A) 4
(B) 6
(C) 8
(D) 10
(E) 12

AMC 8, 2003, Problem 14

In this addition problem, each letter stands for a different digit.

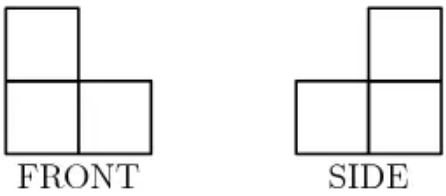
$$\begin{array}{cccc} & T & W & O \\ + & T & W & O \\ \hline F & O & U & R \end{array}$$

If $T = 7$ and the letter O represents an even number, what is the only possible value for W?

(A) 0
(B) 1
(C) 2
(D) 3
(E) 4

AMC 8, 2003, Problem 15

A figure is constructed from unit cubes. Each cube shares at least one face with another cube. What is the minimum number of cubes needed to build a figure with the front and side views shown?



(A) 3
(B) 4
(C) 5
(D) 6
(E) 7

AMC 8, 2003, Problem 16

Ali, Bonnie, Carlo, and Dianna are going to drive together to a nearby theme p... are using has 4 seats: 1 driver's seat, 1 front passenger seat, and 2 back passenger s... Bonnie and Carlo are the only ones who know how to drive the car. How many possible arrangements are there?

(A) 2

(B) 4

(C) 6

(D) 12

(E) 24

AMC 8, 2003, Problem 17

The six children listed below are from two families of three siblings each. Each child has blue or brown eyes and black or blond hair. Children from the same family have at least one of these characteristics in common. Which two children are Jim's siblings?

Child	Eye Color	Hair Color
Benjamin	Blue	Black
Jim	Brown	Blonde
Nadeen	Brown	Black
Austin	Blue	Blonde
Tevyn	Blue	Black
Sue	Blue	Blonde

(A) Nadeen and Austin

(B) Benjamin and Sue

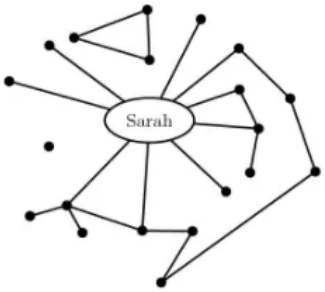
(C) Benjamin and Austin

(D) Nadeen and Tevy

(E) Austin and Sue.

AMC 8, 2003, Problem 18

Each of the twenty dots on the graph below represents one of Sarah's classmates. Classmates who are friends are connected with a line segment. For her birthday party, Sarah is inviting only the following: all of her friends and all of those classmates who are friends with at least one of her friends. How many classmates will not be invited to Sarah's party?



(A) 1

(B) 4

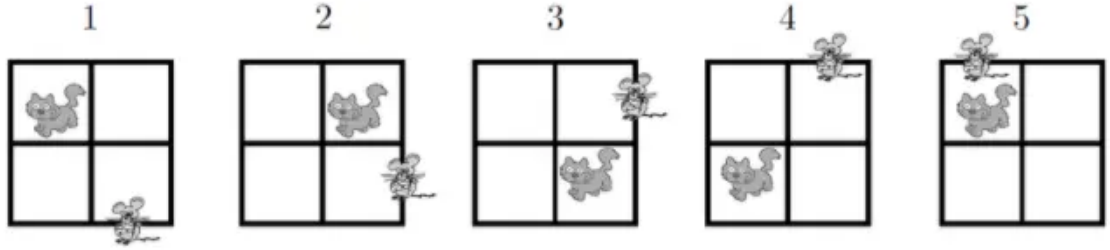
(C) 5

(D) 6

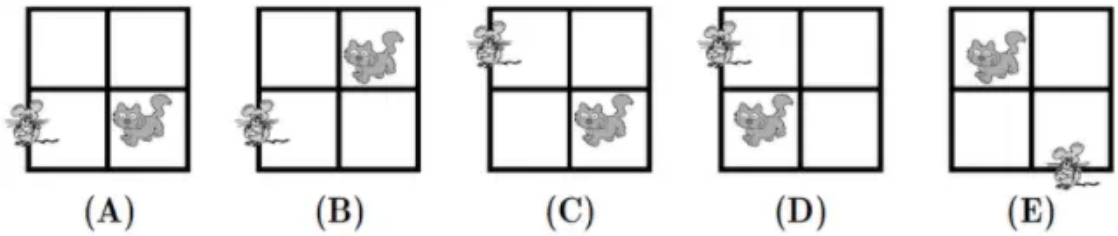
(E) 7

AMC 8, 2003, Problem 23

In the pattern below, the cat moves clockwise through the four squares and the mouse moves counterclockwise through the eight exterior segments of the four squares.

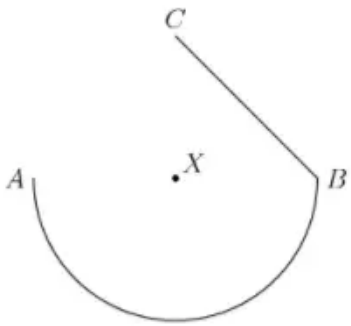


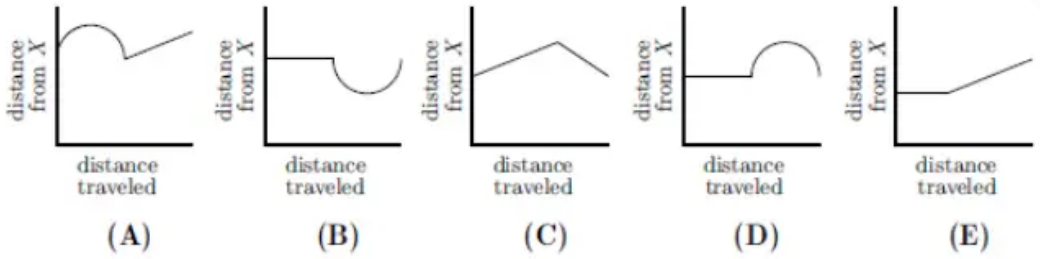
If the pattern is continued, where would the cat and mouse be after the 247 th move?



AMC 8, 2003, Problem 24

A ship travels from point A to point B along a semicircular path, centered at Island X. Then it travels along a straight path from B to C. Which of these graphs best shows the ship's distance from Island X as it moves along its course?





AMC 8, 2002, Problem 1

A circle and two distinct lines are drawn on a sheet of paper. What is the largest possible number of points of intersection of these figures?

(A) 2

(B) 3

(C) 4

(D) 5

(E) 6

AMC 8, 2002, Problem 2

How many different combinations of $5 bills and $2 bills can be used to make a total of $17? order does not matter in this problem.

(A) 2

(B) 3

(C) 4

(D) 5

(E) 6

AMC 8, 2002, Problem 3

What is the smallest possible average of four distinct positive even integers?

(A) 3

(B) 4

(C) 5

(D) 6

(E) 7

AMC 8, 2002, Problem 5

Carlos Montado was born on Saturday, November 9, 2002. On what day of the week will Carlos

be 706 days old?

(A) Monday

(B) Wednesday

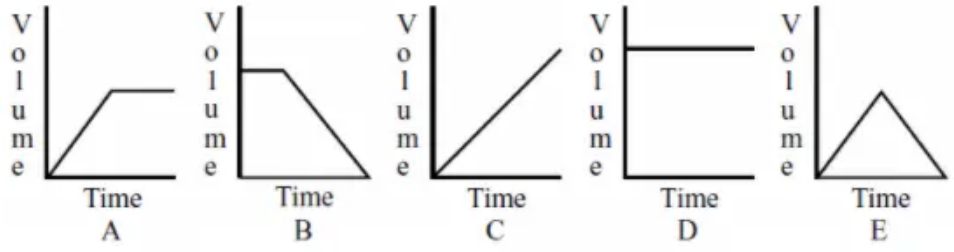
(C) Friday

(D) Saturday

(E) Sunday

AMC 8, 2002, Problem 6

A birdbath is designed to overflow so that it will be self-cleaning. Water flows in at the rate of 20 milliliters per minute and drains at the rate of 18 milliliters per minute. One of these graphs shows the volume of water in the birdbath during the filling time and continuing into the overflow time. Which one is it?



(A) A

(B) B

(C) C

(D) D

(E) E

AMC 8, 2002, Problem 7

The students in Mrs. Sawyer's class were asked to do a taste test of five kinds of candy. Each student chose one kind of candy. A bar graph of their preferences is shown. What percent of her class chose candy E?

(A) 5
(B) 12
(C) 15
(D) 16
(E) 20

AMC 8, 2002, Problem 8

Juan organizes the stamps in his collection by country and by the decade in which they were issued. The prices he paid for them at a stamp shop were: Brazil and France, 6 cents each, Peru 4 cents each, and Spain 5 cents each. (Brazil and Peru are South American countries and France and Spain are in Europe.)

Number of Stamps by Decade

Country	50s	60s	70s	80s
Brazil	4	7	12	8
France	8	4	12	15
Peru	6	4	6	10
Spain	3	9	13	9

Juan's Stamp Collection

How many of his European stamps were issued in the '80s?
(A) 9
(B) 15
(C) 18
(D) 24
(E) 42

AMC 8, 2002, Problem 9

Juan organizes the stamps in his collection by country and by the decade in which they were issued. The prices he paid for them at a stamp shop were: Brazil and France, 6 cents each, Peru 4 cents each, and Spain 5 cents each. (Brazil and Peru are South American countries and France and Spain are in Europe.)

Number of Stamps by Decade

Country	50s	60s	70s	80s
Brazil	4	7	12	8
France	8	4	12	15
Peru	6	4	6	10
Spain	3	9	13	9

Juan's Stamp Collection

His South American stamps issued before the ′70s cost him
(A) $0.40

(B) $1.06
(C) $1.80
(D) $2.38
(E) $2.64

AMC 8, 2002, Problem 10

Juan organizes the stamps in his collection by country and by the decade in which they were issued. The prices he paid for them at a stamp shop were: Brazil and France, 6 cents each, Peru 4 cents each, and Spain 5 cents each. (Brazil and Peru are South American countries and France and Spain are in Europe.)

Number of Stamps by Decade

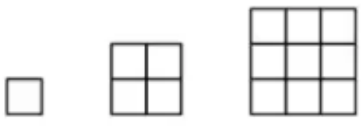
Country	50s	60s	70s	80s
Brazil	4	7	12	8
France	8	4	12	15
Peru	6	4	6	10
Spain	3	9	13	9

Juan's Stamp Collection

The average price of his '70s stamps is closest to
(A) 3.5 cents
(B) 4 cents
(C) 4.5 cents
(D) 5 cents
(E) 5.4 cents

AMC 8, 2002, Problem 11

A sequence of squares is made of identical square tiles. The edge of each square is one tile length longer than the edge of the previous square. The first three squares are shown. How many more tiles does the seventh square require than the sixth?



(A) 11
(B) 12
(C) 13
(D) 14
(E) 15

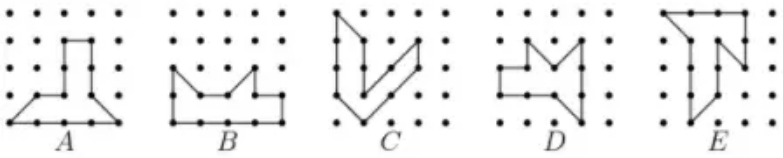
AMC 8, 2002, Problem 12

A board game spinner is divided into three regions labeled A, B and C. The probability of the arrow stopping on region A is $\frac{1}{3}$ and on region B is $\frac{1}{2}$. The probability of the arrow stopping on region C is

(A) $\frac{1}{12}$
(B) $\frac{1}{6}$
(C) $\frac{1}{5}$
(D) $\frac{1}{3}$
(E) $\frac{2}{5}$

AMC 8, 2002, Problem 15

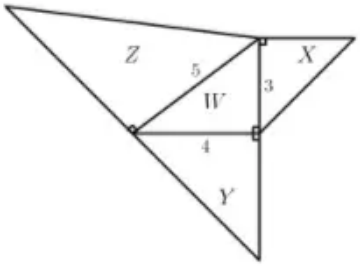
Which of the following polygons has the largest area?



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

AMC 8, 2002, Problem 16

Right isosceles triangles are constructed on the sides of a $3-4-5$ right triangle, as shown. A capital letter represents the area of each triangle. Which one of the following is true?



(A) $X+Z=W+Y$
(B) $W+X=Z$
(C) $3X+4Y=5Z$

(D) $X + W = \frac{1}{2}(Y + Z)$
(E) $X + Y = Z$

AMC 8, 2002, Problem 17

In a mathematics contest with ten problems, a student gains 5 points for a correct answer and loses 2 points for an incorrect answer. If Olivia answered every problem and her score was 29, how many correct answers did she have?
(A) 5
(B) 6
(C) 7
(D) 8
(E) 9

AMC 8, 2002, Problem 18

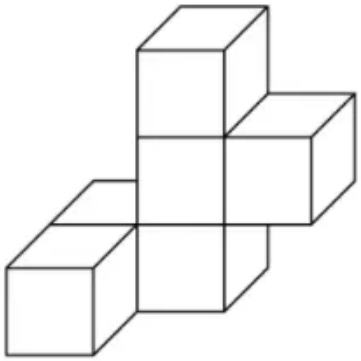
Gage skated 1 hr 15 min each day for 5 days and 1 hr 30 min each day for 3 days. How long would he have to skate the ninth day in order to average 85 minutes of skating each day for the entire time?
(A) 1hr
(B) 1 hr 10 min
(C) 1 hr 20 min
(D) 1hr40 min
(E) 2hr

AMC 8, 2002, Problem 21

Harold tosses a nickel four times. The probability that he gets at least as many heads as tails is
(A) $\frac{5}{16}$
(B) $\frac{3}{8}$
(C) $\frac{1}{2}$
(D) $\frac{5}{8}$
(E) $\frac{11}{16}$

AMC 8, 2002, Problem 22

Six cubes, each an inch on an edge, are fastened together, as shown. Find the total surface area in square inches. Include the top, bottom and sides.



(A) 18
(B) 24
(C) 26
(D) 30
(E) 36

AMC 8, 2001, Problem 14

Tyler has entered a buffet line in which he chooses one kind of meat, two different vegetables and one dessert. If the order of food items is not important, how many different meals might he choose?

- Meat: beef, chicken, pork
- Vegetables: baked beans, corn, potatoes, tomatoes
- Dessert: brownies, chocolate cake, chocolate pudding, ice cream

(A) 4
(B) 24
(C) 72
(D) 80
(E) 144

AMC 8, 2001, Problem 17

For the game show Who Wants To Be A Millionaire? the dollar values of each question are shown in the following table (where $\mathrm{K} = 1000$)

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Value	100	200	300	500	1K	2K	4K	8K	16K	32K	64K	125K	250K	500K	1000K

Between which two questions is the percent increase of the value the smallest?
(A) From 1 to 2

(B) From 2 to 3

(C) From 3 to 4

(D) From 11 to 12

(E) From 14 to 15

AMC 8, 2001, Problem 18

Two dice are thrown. What is the probability that the product of the two numbers is a multiple of 5 ?

(A) $\frac{1}{36}$

(B) $\frac{1}{18}$

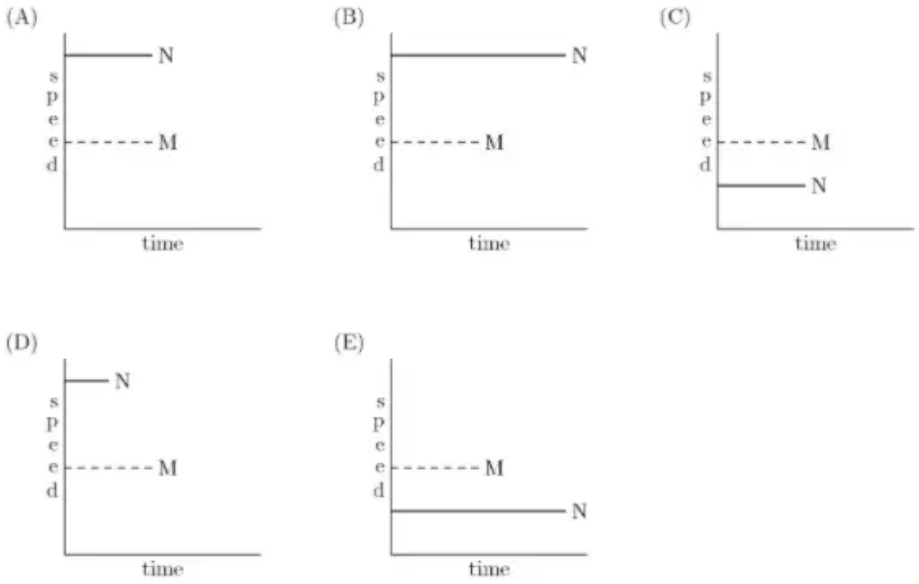
(C) $\frac{1}{6}$

(D) $\frac{11}{36}$

(E) $\frac{1}{3}$

AMC 8, 2001, Problem 19

Car M traveled at a constant speed for a given time. This is shown by the dashed line. Car N traveled at twice the speed for the same distance. If Car N's speed and time are shown as solid line, which graph illustrates this?



AMC 8, 2001, Problem 20

Kaleana shows her test score to Quay, Marty and Shana, but the others keep theirs hidden. Quay thinks, "At least two of us have the same score." Marty thinks, "I didn't get the lowest score." Shana thinks, "I didn't get the highest score." List the scores from lowest to highest for

Marty (M), Quay (Q) and Shana (S).

(A) S, Q, M

(B) Q, M, S

(C) Q, S, M

(D) M, S, Q

(E) S, M, Q

AMC 8, 2001, Problem 21

The mean of a set of five different positive integers is 15 . The median is 18 . The maximum possible value of the largest of these five integers is

(A) 19

(B) 24

(C) 32

(D) 35

(E) 40

AMC 8, 2001, Problem 22

On a twenty-question test, each correct answer is worth 5 points, each unanswered question is worth 1 point and each incorrect answer is worth 0 points. Which of the following scores is NOT possible?

(A) 90

(B) 91

(C) 92

(D) 95

(E) 97

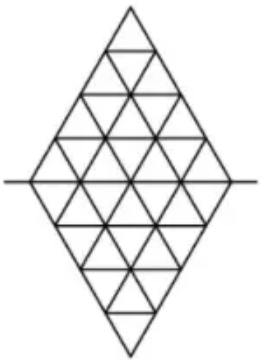
AMC 8, 2001, Problem 23

Points R, S and T are vertices of an equilateral triangle, and points X, Y and Z are midpoints of its sides. How many noncongruent triangles can be drawn using any three of these six points as vertices?

(A) 1
(B) 2
(C) 3
(D) 4
(E) 20

AMC 8, 2001, Problem 24

Each half of this figure is composed of 3 red triangles, 5 blue triangles and 8 white triangles. When the upper half is folded down over the centerline, 2 pairs of red triangles coincide, as do 3 pairs of blue triangles. There are 2 red-white pairs. How many white pairs coincide?



(A) 4
(B) 5
(C) 6
(D) 7
(E) 9

Soluciones

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1	A	A	E	B	E	C	B	B	C	D	D	B	C	B	A	B	D	D	E	B	B	D	D	B	E	C
2	B	A	B	E	D	A	C	D	C	D	C	C	D	E	C	A	D	A	C	B	C	C	E	A	D	D
3	D	C	E	B	A	E	E	D	B	C	E	A	B	B	D	D	E	C	D	A	D	A	C	A	C	C
4	C	C	C	E	E	E	E	E	E	B	C	B	E	E	A	E	E	B	C	B	C	B	D	C	B	C
5	C	D	A	B	D	B	B	E	C	B	C	A	A	B	D	C	C	C	B	D	B	D	B	E	D	B
6	D	E	B	B	C	D	C	D	B	A	C	C	C	B	E	A	B	A	B	C	C	C	E	D	A	E
7	C	B	C	D	D	C	D	A	A	B	B	B	D	D	E	B	A	E	A	B	B	B	D	E	C	B
8	A	E	B	C	E	D	D	C	D	C	D	B	B	C	A	D	E	D	A	B	E	E	B	D	B	D
9	A	E	C	C	C	D	B	B	D	A	C	D	C	C	C	D	D	B	C	D	D	C	B	D	B	D
10	C	B	B	E	D	A	B	B	B	A	A	D	C	E	E	E	A	E	E	E	D	A	D	D	D	B
11	E	A	B	C	B	E	B	B	C	B	D	D	A	C	D	C	C	C	B	C	C	C	D	A	D	B
12	B	D	C	A	E	B	D	C	E	A	E	B	D	A	B	D	A	B	E	B	D	D	A	C	D	D
13	B	C	E	C	A	C	C	B	D	C	E	E	A	C	C	C	D	E	B	E	C	D	C	C	B	E
14	B	C	B	E	C	B	D	D	C	E	B	B	D	E	D	D	C	B	D	C	B	B	C	C	B	C
15	C	B	D	D	D	E	C	C	A	A	B	E	B	D	D	C	A	E	B	C	C	C	A	B	D	C
16	D	A	E	B	A	D	B	B	C	E	C	C	E	B	B	C	E	E	D	C	D	E	A	D	D	B
17	D	E	D	C	B	A	C	B	B	D	D	C	E	C	C	A	B	C	E	D	E	B	C	D	B	D
18	E	B	C	B	B	C	C	A	A	B	C	A	B	B	E	E	D	E	D	A	C	D	D	E	C	C
19	B	D	A	A	B	B	C	C	A	E	D	C	D	A	B	C	D	D	C	B	A	D	C	B	D	C
20	C	D	A	D	D	A	A	D	D	D	B	A	A	D	B	A	A	D	D	D	A	C	A	B	D	A
21	E	E	C	B	D	B	A	B	D	C	B	D	D	B	B	B	D	E	B	D	C	A	D	C	D	C
22	B	C	D	D	C	B	D	C	D	D	A	B	E	D	D	C	E	C	C	B	E	D	C	A	D	E
23	E	B	D	C	C	B	A	B	C	D	B	E	C	C	C	B	D	B	A	D	B	A	B	C	B	B
24	D	B	D	E	E	C	E	A	C	B	C	C	C	E	B	D	B	B	B	C	B	A	C	C	E	A
25	A	D	A	D	C	C	C	D	E	A	D	A	D	D	A	B	D	B	C	D	A	B	B	A	E	E

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2022	2023	2024
1	E	E	A	A	A	C	A	A	D	E	A	D	B
2	E	B	D	E	D	A	E	D	E	C	D	E	C
3	D	B	E	B	D	A	C	D	E	D	E	B	E
4	C	C	C	E	E	B	D	C	D	B	E	D	E
5	D	E	E	C	A	E	B	E	B	C	C	B	B
6	D	E	C	D	B	B	D	C	C	A	C	C	D
7	C	B	C	B	E	B	A	B	A	C	B	B	E
8	B	D	C	D	D	C	D	C	E	C	B	A	D
9	E	C	C	D	D	B	D	B	B	D	B	B	E
10	C	D	C	A	B	D	C	C	B	C	E	D	B
11	A	D	D	A	B	B	C	C	D	E	D	C	D
12	B	A	B	B	C	B	D	B	A	A	B	B	E
13	C	C	A	D	D	D	B	A	A	B	D	D	B
14	C	B	C	B	D	A	C	D	C	D	D	E	A
15	D	D	B	C	D	C	D	D	B	C	C	B	C
16	C	C	E	B	B	D	D	C	D	E	B	C	D
17	A	B	B	B	D	D	C	A	B	B	B	A	E
18	D	A	B	D	B	C	B	E	C	A	C	D	A
19	D	C	D	A	A	E	D	C	C	B	C	C	C
20	D	B	C	B	D	A	B	A	D	B	D	D	D
21	C	D	E	A	C	B	A	E	E	A	C	C	E
22	D	D	E	E	C	C	D	B	E	E	A	D	B
23	D	C	B	A	D	C	C	D	B	B	D	C	C
24	A	A	C	C	B	A	D	C	B	A	C	A	B
25	A	C	A	B	C	B	B	E	C	A	E	A	C