AMC 10B 2010 Problem 3

A drawer contains red, green, blue, and white socks with at least 2 of each color. What is the minimum number of socks that must be pulled from the drawer to guarantee a matching pair?

(A) 3 **(B)** 4 **(C)** 5 **(D)** 8 **(E)** 9

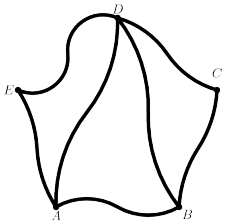
AMC 10B 2008 Problem 16

Two fair coins are to be tossed once. For each head that results, one fair die is to be rolled. What is the probability that the sum of the die rolls is odd? (Note that if no die is rolled, the sum is 0.)

(A) $\frac{3}{8}$ (B) $\frac{1}{2}$ (C) $\frac{43}{72}$ (D) $\frac{5}{8}$ (E) $\frac{2}{3}$

AMC 12A 2013 Problem 12

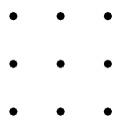
Cities A, B, C, D, and E are connected by roads $\widetilde{AB}$, $\widetilde{AD}$, $\widetilde{AE}$, $\widetilde{BC}$, $\widetilde{BD}$, $\widetilde{CD}$, and $\widetilde{DE}$. How many different routes are there from A to B that use each road exactly once? (Such a route will necessarily visit some cities more than once.)



(A) 7 **(B)** 9 **(C)** 12 **(D)** 16 **(E)** 18

AMC 10A 2004 Problem 5

A set of three points is randomly chosen from the grid shown. Each three point set has the same probability of being chosen. What is the probability that the points lie on the same straight line?



(A) $\frac{1}{21}$ (B) $\frac{1}{14}$ (C) $\frac{2}{21}$ (D) $\frac{1}{7}$ (E) $\frac{2}{7}$

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 the number of possible values of the median of R ?

(A) 4 **(B)** 5 **(C)** 6 **(D)** 7 **(E)** 8

AMC 12A 2007 Problem 25

Call a set of integers spacy if it contains no more than one out of any three consecutive integers. How many subsets of $\{1, 2, 3, \ldots, 12\}$, including the empty set, are spacy?

(A) 121 (B) 123 (C) 125 (D) 127 (E) 129

AMC 12A 2015 Problem 9

A box contains 2 red marbles, 2 green marbles, and 2 yellow marbles. Carol takes 2 marbles from the box at random; then Claudia takes 2 of the remaining marbles at random; and then Cheryl takes the last 2 marbles. What is the probability that Cheryl gets 2 marbles of the same color?

(A) $\frac{1}{10}$ **(B)** $\frac{1}{6}$ **(C)** $\frac{1}{5}$ **(D)** $\frac{1}{3}$ **(E)** $\frac{1}{2}$

AMC 10A 2010 Problem 18

Bernardo randomly picks 3 distinct numbers from the set $\{1,2,3,4,5,6,7,8,9\}$ and arranges them in descending order to form a 3-digit number. Silvia randomly picks 3 distinct numbers from the set $\{1,2,3,4,5,6,7,8\}$ and also arranges them in descending order to form a 3-digit number. What is the probability that Bernardo's number is larger than Silvia's number?

(A) $\frac{47}{72}$ **(B)** $\frac{37}{56}$ **(C)** $\frac{2}{3}$ **(D)** $\frac{49}{72}$ **(E)** $\frac{39}{56}$

AMC 12A 2015 Problem 17

Eight people are sitting around a circular table, each holding a fair coin. All eight people flip their coins and those who flip heads stand while those who flip tails remain seated. What is the probability that no two adjacent people will stand?

(A) $\frac{47}{256}$ **(B)** $\frac{3}{16}$ **(C)** $\frac{49}{256}$ **(D)** $\frac{25}{128}$ **(E)** $\frac{51}{256}$

AHSME 1951

A six place number is formed by repeating a three place number; for example 256,256 or 678,678, etc. What is the largest integer that divides all such integers?

AMC 10B 2009 Problem 6

Kiana has two older twin brothers. The product of their three ages is 128. What is the sum of their three ages?

(A) 10 **(B)** 12 **(C)** 16 **(D)** 18 **(E)** 24

AMC 12A 2004 Problem 25

For each integer $n \geq 4$, let a_n denote the base-n number $0.\overline{133}_n$. The product $a_4a_5...a_{99}$ can be expressed as $\frac{m}{n!}$, where m and n are positive integers and n is as small as possible. What is the value of m?

(A)98 **(B)**101 **(C)**132 **(D)**798 **(E)**962

AMC 10A 2010 Problem 10

Marvin had a birthday on Tuesday, May 27 in the leap year 2008**. In what year will his birthday next fall on a Saturday?**

(A) 2011 (B) 2012 (C) 2013 (D) 2015 (E) 2017

AMC 12B 2013 Problem 9

What is the sum of the exponents of the prime factors of the square root of the largest perfect square that divides 12! **?**

(A) 5 **(B)** 7 **(C)** 8 **(D)** 10 **(E)** 12

AMC 10A 2011 Problem 19

In 1991 the population of a town was a perfect square. Ten years later, after an increase of 150 people, the population was 9 more than a perfect square. Now, in 2011, with an increase of another 150 people, the population is once again a perfect square. Which of the following is closest to the percent growth of the town's population during this twenty-year period?

(A) 42 **(B)** 47 **(C)** 52 **(D)** 57 **(E)** 62

AMC 10B 2009 Problem 7

In a certain year the price of gasoline rose by 20% during January, fell by 20% during February, rose by 25% during March, and fell by x% during April. The price of gasoline at the end of April was the same as it had been at the beginning of January. To the nearest integer, what is x?

(A) 12 **(B)** 17 **(C)** 20 **(D)** 25 **(E)** 35

AMC 12A 2007 Problem 15

The set $\{3, 6, 9, 10\}$ is augmented by a fifth element n, not equal to any of the other four. The median of the resulting set is equal to its mean. What is the sum of all possible values of n?

(A) 7 (B) 9 (C) 19 (D) 24 (E) 26

AMC 12A 2004 Problem 21

If $\sum_{n=0}^{\infty} \cos^{2n}\theta = 5$, what is the value of $\cos 2\theta$?

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

AMC 10A 2007 Problem 2

Define $a@b = ab - b^2$ and $a\#b = a + b - ab^2$. What is $\dfrac{6@2}{6\#2}$?

(A) $-\dfrac{1}{2}$ **(B)** $-\dfrac{1}{4}$ **(C)** $\dfrac{1}{8}$ **(D)** $\dfrac{1}{4}$ **(E)** $\dfrac{1}{2}$

AMC 10B 2009 Problem 7

By inserting parentheses, it is possible to give the expression

$$2 \times 3 + 4 \times 5$$

several values. How many different values can be obtained?

(A) 2 **(B)** 3 **(C)** 4 **(D)** 5 **(E)** 6

AMC 12A 2015 Problem 14

What is the value of a for which $\dfrac{1}{\log_2 a} + \dfrac{1}{\log_3 a} + \dfrac{1}{\log_4 a} = 1$

(A) 9 **(B)** 12 **(C)** 18 **(D)** 24 **(E)** 36

AMC 12A 2004 Problem 17

Let f be a function with the following properties:

- $f(1) = 1,$ **and**
- $f(2n) = n \times f(n),$ **for any positive integer n.**

What is the value of $f(2^{100})$?

(A) 1 **(B)** 2^{99} **(C)** 2^{100} **(D)** 2^{4950} **(E)** 2^{9999}

AMC 12A 2004 Problem 16

The set of all real numbers x for which

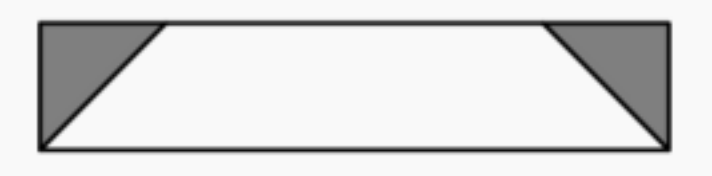
$$\log_{2004}(\log_{2003}(\log_{2002}(\log_{2001} x)))$$

is defined as $\{x|x > c\}$. What is the values of c?

(A) 0 **(B)** 2001^{2002} **(C)** 2002^{2003} **(D)** 2003^{2004} **(E)** $2001^{2002^{2003}}$

AMC 10B 2009 Problem 4

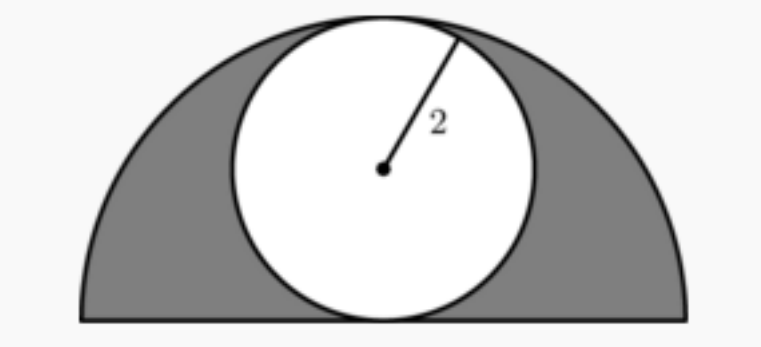
A rectangular yard contains two flower beds in the shape of congruent isosceles right triangles. The remainder of the yard has a trapezoidal shape, as shown. The parallel sides of the trapezoid have lengths 15 and 25 meters. What fraction of the yard is occupied by the flower beds?



(A) $\frac{1}{8}$ **(B)** $\frac{1}{6}$ **(C)** $\frac{1}{5}$ **(D)** $\frac{1}{4}$ **(E)** $\frac{1}{3}$

AMC 10A 2009 Problem 6

A circle of radius 2 is inscribed in a semicircle, as shown. The area inside the semicircle but outside the circle is shaded. What fraction of the semicircle's area is shaded?



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

AMC 10B 2007 Problem 7

All sides of the convex pentagon $ABCDE$ are of equal length, and $\angle A = \angle B = 90°$. What is the degree measure of $\angle E$?

(A) 90 **(B)** 108 **(C)** 120 **(D)** 144 **(E)** 150

AMC 12A 2002 Problem 23

In triangle ABC , side AC and the perpendicular bisector of BC meet in point D, and BD bisects $\angle ABC$. If $AD = 9$ and $DC = 7$, what is the area of triangle ABD?

(A) 14 **(B)** 21 **(C)** 28 **(D)** $14\sqrt{5}$ **(E)** $28\sqrt{5}$

AMC 10A 2009 Problem 23

Convex quadrilateral $ABCD$ has $AB = 9$ and $CD = 12$. Diagonals AC and BD intersect at E, $AC = 14$, and $\triangle AED$ and $\triangle BEC$ have equal areas. What is AE?

(A) $\frac{9}{2}$ **(B)** $\frac{50}{11}$ **(C)** $\frac{21}{4}$ **(D)** $\frac{17}{3}$ **(E)** 6