

2008 AMC10B 试题

Problem 1

A basketball player made 5 baskets during a game. Each basket was worth either 2 or 3 points. How many different numbers could represent the total points scored by the player?

某个篮球运动员在一场比赛中进球 5 次。每次进球得 2 分或者 3 分。那么这个球员所得总分可以用多少个不同的数字表示？

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

Problem 2

A 4×4 block of calendar dates is shown. The order of the numbers in the second row is to be reversed. Then the orders of the numbers in the fourth row is to be reversed. Finally, the numbers on each diagonal are to be added. What will be the positive difference between the two diagonal sums?

如下所示一个 4×4 的表格显示了日历的日期。现在要将第 2 行的数字反过来排列，然后将第 4 行的数字也反过来排列。最后将每条对角线上的数字相加。问这 2 条对角线上数字之和的差的绝对值是多少？

1	2	3	4
8	9	10	11
15	16	17	18
22	23	24	25

- (A) 2 (B) 4 (C) 6 (D) 8 (E) 10

Problem 3

Assume that x is a positive real number. Which is equivalent to $\sqrt[3]{x\sqrt{x}}$?

假设 x 是个正实数。下面哪个等于 $\sqrt[3]{x\sqrt{x}}$?

- (A) $x^{1/6}$ (B) $x^{1/4}$ (C) $x^{3/8}$ (D) $x^{1/2}$ (E) x

Problem 4

A semipro baseball league has teams with 21 players each. League rules state that a player must be paid at least \$15,000 and that the total of all players' salaries for each team cannot exceed \$700,000. What is the maximum possible salary, in dollars, for a single player?

半职业棒球联盟的每支球队均有 21 个球员。联盟规则规定，一名球员必须至少获得 \$15,000 的工资，并且每支球队所有球员的工资总额不得超过 \$700,000。则一名球员的最高可能工资（以美元计）是多少？

- (A) 270,000 (B) 385,000 (C) 400,000 (D) 430,000 (E) 700,000

Problem 5

For real numbers a and b , define $a\$b = (a - b)^2$. What is $(x - y)^2 \$(y - x)^2$?

a 和 b 都是实数，定义 $a\$b = (a - b)^2$ 。则 $(x - y)^2 \$(y - x)^2$ 是多少？

- (A) 0 (B) $x^2 + y^2$ (C) $2x^2$ (D) $2y^2$ (E) $4xy$

Problem 6

Points B and C lie on AD . The length of AB is 4 times the length of BD , and the length of AC is 9 times the length of CD . The length of BC is what fraction of the length of AD ?

点 B 和 C 在线段 AD 上。线段 AB 的长度是线段 BD 的 4 倍，线段 AC 的长度是线段 CD 的 9 倍。那么线段 BC 的长度所占线段 AD 的比例是多少？

- (A) $1/36$ (B) $1/13$ (C) $1/10$ (D) $5/36$ (E) $1/5$

Problem 7

An equilateral triangle of side length 10 is completely filled in by non-overlapping equilateral triangles of side length 1. How many small triangles are required?

一个边长为 10 的等边三角形要完全被一些不重叠的边长为 1 的等边三角形所覆盖。那么需要多少个小的三角形？

- (A) 10 (B) 25 (C) 100 (D) 250 (E) 1000

Problem 8

A class collects \$50 to buy flowers for a classmate who is in the hospital. Roses cost \$3 each, and carnations cost \$2 each. No other flowers are to be used. How many different bouquets could be purchased for exactly \$50?

某个班级的学生募集到了 50 美元，准备用于买花去看望一个住院的同班同学。

玫瑰每朵 3 美元，康乃馨每朵 2 美元。不会用到其他种类的花。问恰好花费 50

美元可以买到多少种不同的花束？

- (A) 1 (B) 7 (C) 9 (D) 16 (E) 17

Problem 9

A quadratic equation $ax^2 - 2ax + b = 0$ has two real solutions. What is the average of these two solutions?

一个一元二次方程 $ax^2 - 2ax + b = 0$ 有 2 个实数根。那么这 2 个实数根的平均值是多少？

- (A) 1 (B) 2 (C) $\frac{b}{a}$ (D) $\frac{2b}{a}$ (E) $\sqrt{2b - a}$

Problem 10

Points A and B are on a circle of radius 5 and $AB = 6$. Point C is the midpoint of the minor arc AB . What is the length of the line segment AC ?

点 A 和点 B 位于半径为 5 的圆上， $AB = 6$ 。点 C 为劣弧 AB 的中点。则线段 AC 的长度是多少？

- (A) $\sqrt{10}$ (B) $\frac{7}{2}$ (C) $\sqrt{14}$ (D) $\sqrt{15}$ (E) 4

Problem 11

Suppose that (u_n) is a sequence of real numbers satisfying $u_{n+2} = 2u_{n+1} + u_n$, and that $u_3 = 9$ and $u_6 = 128$. What is u_5 ?

假设 (u_n) 是个实数数列，满足 $u_{n+2} = 2u_{n+1} + u_n$ ，且 $u_3 = 9$ ， $u_6 = 128$ 。

那么 u_5 是多少？

- (A) 40 (B) 53 (C) 68 (D) 88 (E) 104

Problem 12

Postman Pete has a pedometer to count his steps. The pedometer records up to 99999 steps, then flips over to 00000 on the next step. Pete plans to determine his mileage for a year. On January 1 Pete sets the pedometer to 00000. During the year, the pedometer flips from 99999 to 00000 forty-four times. On December 31 the pedometer reads 50000. Pete takes 1800 steps per mile. Which of the following is closest to the number of miles Pete walked during the year?

邮递员 Pete 有一个计步器来计算他的步数。计步器最多记录 99999 步，然后在下一步翻转到 00000 步。Pete 打算确定他一年内的英里数。1 月 1 日，Pete 将计步器设置为 00000。在这一年里，计步器从 99999 翻转为 00000 共翻转了 44 次。12 月 31 日，计步器读数为 50000。Pete 每英里走 1800 步。以下哪项最接近 Pete 这一年中走的英里数？

- (A) 2500 (B) 3000 (C) 3500 (D) 4000 (E) 4500

Problem 13

For each positive integer n , the mean of the first n terms of a sequence is n . What is the 2008th term of the sequence?

对于每个正整数 n ，一个数列的前 n 项的平均值是 n 。那么这个数列的第 2008 项是多少？

- (A) 2008 (B) 4015 (C) 4016 (D) 4,030,056 (E) 4,032,064

Problem 14

Triangle OAB has $O = (0, 0)$, $B = (5, 0)$, and A in the first quadrant. In addition, $\angle ABO = 90^\circ$ and $\angle AOB = 30^\circ$. Suppose that OA is rotated 90° counterclockwise about O . What are the coordinates of the image of A ?

三角形 OAB 中， $O = (0, 0)$, $B = (5, 0)$ ，且 A 在第一象限。并且， $\angle ABO = 90^\circ$ ， $\angle AOB = 30^\circ$ 。假设 OA 绕着点 O 逆时针旋转 90° 。则 A 的像的坐标是多少？

- (A) $\left(-\frac{10}{3}\sqrt{3}, 5\right)$ (B) $\left(-\frac{5}{3}\sqrt{3}, 5\right)$ (C) $(\sqrt{3}, 5)$ (D) $\left(\frac{5}{3}\sqrt{3}, 5\right)$ (E) $\left(\frac{10}{3}\sqrt{3}, 5\right)$

Problem 15

How many right triangles have integer leg lengths a and b and a hypotenuse of length $b + 1$, where $b < 100$?

有多少个直角三角形，满足直角边长 a 和 b 均为整数，且斜边长为 $b + 1$ ，其中 $b < 100$?

- (A) 6 (B) 7 (C) 8 (D) 9 (E) 10

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.)

两枚标准硬币各被掷一次。每出现一次正面朝上，则掷一枚骰子。问骰子上得到的数的总和是个奇数的概率是多少?(注意，若没有掷骰子，则和为 0.)

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

Problem 17

A poll shows that 70% of all voters approve of the mayor's work. On three separate occasions a pollster selects a voter at random. What is the probability that on exactly one of these three occasions the voter approves of the mayor's work?

一项调查表明 70% 的投票者赞成市长的工作。在三个不同的场合，民调员随机选择一名选民。问这三种场合中恰好有一个场合被选择的选民赞成市长工作的概率是多少?

- (A) 0.063 (B) 0.189 (C) 0.233 (D) 0.333 (E) 0.441

Problem 18

Bricklayer Brenda would take nine hours to build a chimney alone, and bricklayer Brandon would take 10 hours to build it alone. When they work together, they talk a lot, and their combined output decreases by 10 bricks per hour. Working together, they build the chimney in 5 hours. How many bricks are in the chimney?

砖匠 Brenda 一个人要花九个小时才能建造一堵烟囱，而砖匠 Brandon 一个人要花 10 个小时才能建完。当他们一起工作的时候，由于他们交谈甚多，导致他们的总工作效率减少每小时 10 块砖。当他们一起工作时，建成一堵烟囱需要 5 小时。问一堵烟囱共有多少块砖？

- (A) 500 (B) 900 (C) 950 (D) 1000 (E) 1900

Problem 19

A cylindrical tank with radius 4 feet and height 9 feet is lying on its side. The tank is filled with water to a depth of 2 feet. What is the volume of water, in cubic feet?

一个半径为 4 英尺，高为 9 英尺的圆柱形水箱侧放在地上。水箱里水深 2 英尺。

问水的体积是多少立方英尺？

- (A) $24\pi - 36\sqrt{2}$ (B) $24\pi - 24\sqrt{3}$ (C) $36\pi - 36\sqrt{3}$ (D) $36\pi - 24\sqrt{2}$ (E) $48\pi - 36\sqrt{3}$

Problem 20

The faces of a cubical die are marked with the numbers 1, 2, 2, 3, 3, and 4. The faces of another die are marked with the numbers 1, 3, 4, 5, 6, and 8. Both dice are thrown. What is the probability that the sum of the top two numbers will be 5, 7, or 9?

一个正方体骰子的 6 个面被分别标记数字 1, 2, 2, 3, 3, 和 4。另一个正方体骰子的 6 个面被分别标记数字 1, 3, 4, 5, 6, 和 8。同时扔这两个骰子。问两个朝上的面的数字之和为 5, 7 或 9 的概率是多少？

- (A) 5/18 (B) 7/18 (C) 11/18 (D) 3/4 (E) 8/9

Problem 21

Ten chairs are evenly spaced around a round table and numbered clockwise from 1 through 10. Five married couples are to sit in the chairs with men and women alternating, and no one is to sit either next to or across from his/her spouse. How many seating arrangements are possible?

10 张椅子等间距的围着一张圆桌放置,并沿顺时针方向分别用数字 1 到 10 标记。
5 对已婚夫妇将坐到这 10 张椅子上,要求男女间隔坐,并且每个人的两侧或者
对面不能是他/她的配偶。问一共有多少种安排座位的方法?

- (A) 240 (B) 360 (C) 480 (D) 540 (E) 720

Problem 22

Three red beads, two white beads, and one blue bead are placed in line in random order. What is the probability that no two neighboring beads are the same color?

3 颗红珠子, 2 颗白珠子, 1 颗蓝珠子以随机顺序排成一行。问不存在两颗相邻的珠子是同种颜色的概率是多少?

- (A) $1/12$ (B) $1/10$ (C) $1/6$ (D) $1/3$ (E) $1/2$

Problem 23

A rectangular floor measures a by b feet, where a and b are positive integers with $b > a$. An artist paints a rectangle on the floor with the sides of the rectangle parallel to the sides of the floor. The unpainted part of the floor forms a border of width 1 foot around the painted rectangle and occupies half of the area of the entire floor. How many possibilities are there for the ordered pair (a, b) ?

一个长方形地板的尺寸为 a 英尺 $\times$ b 英尺, 其中 a 和 b 均为正整数且 $b > a$ 。一名画家在地板上画了一个各边均与地板的边平行的长方形。地板其余没有画的部分在长方形四周形成一个宽度为 1 英尺的边界, 并占据整个地板面积的一半。问有序对 (a, b) 一共有多少种可能性?

- (A) 1 (B) 2 (C) 3 (D) 4 (E) 5

Problem 24

Quadrilateral $ABCD$ has $AB = BC = CD$, angle $ABC = 70$ and angle $BCD = 170$. What is the measure of angle BAD ?

四边形 $ABCD$ 中, $AB = BC = CD$, 角 $ABC = 70^\circ$, 且角 $BCD = 170^\circ$ 。

则角 BAD 的度数是多少?

- (A) 75 (B) 80 (C) 85 (D) 90 (E) 95

Problem 25

Michael walks at the rate of 5 feet per second on a long straight path. Trash pails are located every 200 feet along the path. A garbage truck travels at 10 feet per second in the same direction as Michael and stops for 30 seconds at each pail. As Michael passes a pail, he notices the truck ahead of him just leaving the next pail. How many times will Michael and the truck meet?

Michael 在一条长直小路上以 5 英尺每秒的速度步行。沿着小路每 200 英尺就有一个垃圾桶。一辆垃圾车以每秒 10 英尺的速度朝着与 Michael 相同的方向行驶, 并在每个桶前停留 30 秒。当 Michael 经过某个垃圾桶时, 他注意到前方的卡车刚刚离开下一个垃圾桶。问 Michael 会和卡车相遇多少次?

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