

2010-2014年AMC10B真题汇编含答案

2010 AMC 10B**Problem 1**

What is $100(100 - 3) - (100 \cdot 100 - 3)$?

$100(100 - 3) - (100 \cdot 100 - 3)$ 的值是多少?

- (A) $-20,000$ (B) $-10,000$ (C) -297 (D) -6 (E) 0

Problem 2

Markala attended two meetings during her 9-hour work day. The first meeting took 45 minutes and the second meeting took twice as long. What percent of her work day was spent attending meetings?

Markala 在她工作的 9 小时里参加了 2 次会议。第一场会议耗时 45 分钟，第二场会议时长是第一场的 2 倍。问她工作总时间的百分之多少是花在了会议上?

- (A) 15 (B) 20 (C) 25 (D) 30 (E) 35

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?

一张抽屉里有红色，绿色，蓝色和白色的袜子，每种颜色至少 2 只。问从抽屉里至少需要抽出多少只袜子才能保证存在一双颜色匹配的袜子?

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

Problem 4

For a real number x , define $\heartsuit(x)$ to be the average of x and x^2 . What is $\heartsuit(1) + \heartsuit(2) + \heartsuit(3)$?

对于实数 x ，定义 $\heartsuit(x)$ 为 x 和 x^2 的平均值， $\heartsuit(1) + \heartsuit(2) + \heartsuit(3)$ 的值是多少?

- (A) 3 (B) 6 (C) 10 (D) 12 (E) 20

Problem 5

A month with 31 days has the same number of Mondays and Wednesdays. How many of the seven days of the week could be the first day of this month?

某个月共有 31 天，其中周一的天数和周三的天数相同。一周 7 天有多少天可能成为这个月的第一天？

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

Problem 6

A circle is centered at O , $\overline{AB}$ is a diameter and C is a point on the circle with $\angle COB = 50^\circ$. What is the degree measure of $\angle CAB$?

一个圆的圆心为 O ， $\overline{AB}$ 为直径， C 是圆上一点满足 $\angle COB = 50^\circ$ 。 $\angle CAB$ 的度数是多少？

- (A) 20 (B) 25 (C) 45 (D) 50 (E) 65

Problem 7

A triangle has side lengths 10, 10, and 12. A rectangle has width 4 and area equal to the area of the triangle. What is the perimeter of this rectangle?

一个三角形的三条边长为 10, 10 和 12。一个矩形的宽为 4，面积等于此三角形的面积。那么矩形的周长是多少？

- (A) 16 (B) 24 (C) 28 (D) 32 (E) 36

Problem 8

A ticket to a school play cost x dollars, where x is a whole number. A group of 9th graders buys tickets costing a total of \$48, and a group of 10th graders buys tickets costing a total of \$64. How many values for x are possible?

一张学校戏剧的票要花 x 美元，其中 x 是个整数。一组九年级学生买的票总共花了 48 美元，一组十年级学生买的票总共花了 64 美元。问 x 有多少个可能的值？

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

Problem 9

Lucky Larry's teacher asked him to substitute numbers for a , b , c , d , and e in the expression $a - (b - (c - (d + e)))$ and evaluate the result. Larry ignored the parentheses but added and subtracted correctly and obtained the correct result by coincidence. The numbers Larry substituted for a , b , c , and d were 1, 2, 3, and 4, respectively. What number did Larry substitute for e ?

幸运的 Larry 的老师叫他分别将值代入 a , b , c , d , 和 e 以求得表达式 $a - (b - (c - (d + e)))$ 的值。Larry 忽略了括号，但加减运算是正确的，结果碰巧得到了正确答案。已知 Larry 分别用 1, 2, 3, 4 代替 a , b , c , d 。则 Larry 用什么数代替了 e ?

- (A) -5 (B) -3 (C) 0 (D) 3 (E) 5

Problem 10

Shelby drives her scooter at a speed of 30 miles per hour if it is not raining, and 20 miles per hour if it is raining. Today she drove in the sun in the morning and in the rain in the evening, for a total of 16 miles in 40 minutes. How many minutes did she drive in the rain?

Shelby 在不下雨的情况下以每小时 30 英里的速度驾驶她的滑板车，在下雨的情况下以每小时 20 英里的速度驾驶。今天，她早上驾驶时阳光明媚，晚上驾驶时飘着雨，结果总共用了 40 分钟驾驶了 16 英里。问她在雨中驾驶了多少分钟？

- (A) 18 (B) 21 (C) 24 (D) 27 (E) 30

Problem 11

A shopper plans to purchase an item that has a listed price greater than \$100 and can use any one of the three coupons. Coupon A gives 15% off the listed price, Coupon B gives \$30 off the listed price, and Coupon C gives 25% off the amount by which the listed price exceeds \$100.

Let x and y be the smallest and largest prices, respectively, for which Coupon A saves at least as many dollars as Coupon B or Coupon C. What is $y - x$?

一个顾客计划买一件标价高于 100 美元的商品，并且可以使用下面 3 张优惠券中的任何一张。优惠券 A 将标价降价 15%，优惠券 B 将标价降低 30 美元，优惠券 C 可以将标价超出 100 美元的部分降低 25%。

令 x 和 y 分别表示使用优惠券 A 节省的钱至少和使用优惠券 B 或 C 一样多时，标价的最低价和最高价。那么 $y - x$ 等于多少？

- (A) 50 (B) 60 (C) 75 (D) 80 (E) 100

Problem 12

At the beginning of the school year, 50% of all students in Mr. Wells' math class answered "Yes" to the question "Do you love math", and 50% answered "No." At the end of the school year, 70% answered "Yes" and 30% answered "No." Altogether, $x\%$ of the students gave a different answer at the beginning and end of the school year. What is the difference between the maximum and the minimum possible values of x ?

在某学年的开始，Well 先生数学课上的 50% 的学生对于“你喜欢数学吗”这个问题的回答为“是”，剩下 50% 的学生回答“否”。这学年结束时，70% 的学生回答“是”，剩下 30% 的学生回答“否”。总的来说， $x\%$ 的学生在学年开始和学年结束时给出了不同的回答。那么 x 的最大可能值和最小可能值之差是多少？

- (A) 0 (B) 20 (C) 40 (D) 60 (E) 80

Problem 13

What is the sum of all the solutions of $x = |2x - |60 - 2x||$?

$x = |2x - |60 - 2x||$ 的所有解之和是多少？

- (A) 32 (B) 60 (C) 92 (D) 120 (E) 124

Problem 14

The average of the numbers $1, 2, 3, \dots, 98, 99$, and x is $100x$. What is x ?

数字 $1, 2, 3, \dots, 98, 99$, 和 x 的平均值为 $100x$ 。则 x 是多少？

- (A) $\frac{49}{101}$ (B) $\frac{50}{101}$ (C) $\frac{1}{2}$ (D) $\frac{51}{101}$ (E) $\frac{50}{99}$

Problem 15

On a 50-question multiple choice math contest, students receive 4 points for a correct answer, 0 points for an answer left blank, and -1 point for an incorrect answer. Jesse's total score on the contest was 99. What is the maximum number of questions that Jesse could have answered correctly?

在一次有 50 道选择题的数学竞赛中，学生如果答对一题得 4 分，空着不作答得 0 分，答错得 -1 分。Jesse 在这次竞赛的总分为 99 分。问 Jesse 最多可能答对多少题？

- (A) 25 (B) 27 (C) 29 (D) 31 (E) 33

Problem 16

A square of side length 1 and a circle of radius $\frac{\sqrt{3}}{3}$ share the same center. What is the area inside the circle, but outside the square?

一个边长为 1 的正方形和半径为 $\frac{\sqrt{3}}{3}$ 的圆，它们的中心重合。求位于圆内而在正方形之外的区域的面积是多少

- (A) $\frac{\pi}{3} - 1$ (B) $\frac{2\pi}{9} - \frac{\sqrt{3}}{3}$ (C) $\frac{\pi}{18}$ (D) $\frac{1}{4}$ (E) $\frac{2\pi}{9}$

Problem 17

Every high school in the city of Euclid sent a team of 3 students to a math contest. Each participant in the contest received a different score. Andrea's score was the median among all students, and hers was the highest score on her team. Andrea's teammates Beth and Carla placed 37th and 64th, respectively. How many schools are in the city?

欧几里得市的每一所高中都派出一支 3 名学生组成的队伍去参加某个数学竞赛。每个参赛选手都得到了不同的分数。Andrea 的分数在所有这些学生中是个中位数，并且她的分数是她所在的队的最高分。Andrea 的队友 Beth 和 Carla 分别排在第 37 名和第 64 名。问这个城市总共有多少所学校？

- (A) 22 (B) 23 (C) 24 (D) 25 (E) 26

Problem 18

Positive integers a , b , and c are randomly and independently selected with replacement from the set $\{1, 2, 3, \dots, 2010\}$. What is the probability that $abc + ab + a$ is divisible by 3?

正整数 a , b 和 c 独立、随机且有放回地从集合 $\{1, 2, 3, \dots, 2010\}$ 中抽取。 $abc + ab + a$ 能被 3 整除的概率是多少?

- (A) $\frac{1}{3}$ (B) $\frac{29}{81}$ (C) $\frac{31}{81}$ (D) $\frac{11}{27}$ (E) $\frac{13}{27}$

Problem 19

A circle with center O has area 156π . Triangle ABC is equilateral, $\overline{BC}$ is a chord on the circle, $OA = 4\sqrt{3}$, and point O is outside $\triangle ABC$. What is the side length of $\triangle ABC$?

一个圆心为 O 的圆面积是 156π 。三角形 ABC 为等边三角形, $\overline{BC}$ 是圆的一条弦, $OA = 4\sqrt{3}$, 且点 O 位于 $\triangle ABC$ 之外。求 $\triangle ABC$ 的边长是多少?

- (A) $2\sqrt{3}$ (B) 6 (C) $4\sqrt{3}$ (D) 12 (E) 18

Problem 20

Two circles lie outside regular hexagon $ABCDEF$. The first is tangent to $\overline{AB}$, and the second is tangent to $\overline{DE}$. Both are tangent to lines BC and FA . What is the ratio of the area of the second circle to that of the first circle?

2 个圆位于正六边形 $ABCDEF$ 之外。第一个圆和 $\overline{AB}$ 相切, 第二个圆和 $\overline{DE}$ 相切。两个圆均与直线 BC 和 FA 相切。问第二个圆的面积和第一个圆的面积的比值是多少?

- (A) 18 (B) 27 (C) 36 (D) 81 (E) 108

Problem 21

A palindrome between 1000 and 10,000 is chosen at random. What is the probability that it is divisible by 7?

从所有位于 1000 到 10,000 之间的回环数中随机抽取 1 个，问这个回环数能被 7 整除的概率是多少？

- (A) $\frac{1}{10}$ (B) $\frac{1}{9}$ (C) $\frac{1}{7}$ (D) $\frac{1}{6}$ (E) $\frac{1}{5}$

Problem 22

Seven distinct pieces of candy are to be distributed among three bags. The red bag and the blue bag must each receive at least one piece of candy; the white bag may remain empty. How many arrangements are possible?

把 7 块不同的糖果分配到 3 个包中。要求红包和蓝包必须各分得至少一块糖果；白包可以为空。一共有多少种可能的分配方法？

- (A) 1930 (B) 1931 (C) 1932 (D) 1933 (E) 1934

Problem 23

The entries in a 3×3 array include all the digits from 1 through 9, arranged so that the entries in every row and column are in increasing order. How many such arrays are there?

一个 3×3 的阵列包含了 1 到 9 的所有数字，满足每行每列的数字都以升序排列。一共有多少个这样的阵列？

- (A) 18 (B) 24 (C) 36 (D) 42 (E) 60

Problem 24

A high school basketball game between the Raiders and Wildcats was tied at the end of the first quarter. The number of points scored by the Raiders in each of the four quarters formed an increasing geometric sequence, and the number of points scored by the Wildcats in each of the four quarters formed an increasing arithmetic sequence. At the end of the fourth quarter, the Raiders had won by one point. Neither team scored more than 100 points. What was the total number of points scored by the two teams in the first half?

Raiders 队和 Wildcats 队之间的一场高中篮球赛在第一节打成平局。已知 Raiders 队的 4 节比赛所得的 4 个分数成递增等比数列，而 Wildcats 队的 4 节比赛所得的 4 个分数成递增的等差数列。在第 4 节结束后，Raiders 队的总分比 Wildcats 的总分高 1 分。2 个队伍的总分均不超过 100 分。问这 2 支队伍在前 2 节比赛里的总得分是多少分？

- (A) 30 (B) 31 (C) 32 (D) 33 (E) 34

Problem 25

Let $a > 0$, and let $P(x)$ be a polynomial with integer coefficients such that

$$P(1) = P(3) = P(5) = P(7) = a, \text{ and}$$

$$P(2) = P(4) = P(6) = P(8) = -a.$$

What is the smallest possible value of a ?

令 $a > 0$ ，且多项式 $P(x)$ 的各项系数均为整数，满足

$$P(1) = P(3) = P(5) = P(7) = a,$$

$$P(2) = P(4) = P(6) = P(8) = -a$$

a 的最小可能值是多少？

- (A) 105 (B) 315 (C) 945 (D) 7! (E) 8!

2010 AMC 10B Answer Key

1	2	3	4	5	6	7	8	9	10	11	12	13
C	C	C	C	B	B	D	E	D	C	A	D	C
14	15	16	17	18	19	20	21	22	23	24	25	
B	C	B	B	E	B	D	E	C	D	E	B	

2011 AMC 10B**Problem 1**

What is $\frac{2+4+6}{1+3+5} - \frac{1+3+5}{2+4+6}$

$\frac{2+4+6}{1+3+5} - \frac{1+3+5}{2+4+6}$ 的值是多少?

- (A) -1 (B) $\frac{5}{36}$ (C) $\frac{7}{12}$ (D) $\frac{147}{60}$ (E) $\frac{43}{3}$

Problem 2

Josanna's test scores to date are 90, 80, 70, 60, and 85. Her goal is to raise her test average at least 3 points with her next test. What is the minimum test score she would need to accomplish this goal?

Josanna 目前的考试分数是 90, 80, 70, 60 和 85。她的目标是靠下次考试将她的考试平均分提高至少 3 分, 那么下次至少需要考多少分才能完成这个目标?

- (A) 80 (B) 82 (C) 85 (D) 90 (E) 95

Problem 3

At a store, when a length is reported as x inches that means the length is at least $x - 0.5$ inches and at most $x + 0.5$ inches. Suppose the dimensions of a rectangular tile are reported as 2 inches by 3 inches. In square inches, what is the minimum area for the rectangle?

在某家商店, 长度标为 x 英寸表示实际长度至少为 $x - 0.5$ 英寸, 至多为 $x + 0.5$ 英寸。假设一块长方形瓷砖的尺寸标为 2 x 3 英寸。则在这个长方形瓷砖的最小面积是多少平方英寸?

- (A) 3.75 (B) 4.5 (C) 5 (D) 6 (E) 8.75

Problem 4

LeRoy and Bernardo went on a week-long trip together and agreed to share the costs equally. Over the week, each of them paid for various joint expenses such as gasoline and car rental. At the end of the trip, it turned out that LeRoy had paid A dollars and Bernardo had paid B dollars, where $A < B$. How many dollars must LeRoy give to Bernardo so that they share the costs equally?

LeRoy 和 Bemardo 一起出去旅游了一周，并且商定两人均摊费用。在这一周中，他们两人都支付了各种共同支出，例如汽油和租车费用。旅游结束后，发现 Latoy 花费 A 美元，Bernardo 花费 B 美元，这里 $A < B$ 。那么 LeRoy 需要支付 Bernardo 多少美元，这样能够保证他俩均摊了费用？

- (A) $\frac{A+B}{2}$ (B) $\frac{A-B}{2}$ (C) $\frac{B-A}{2}$ (D) $B-A$ (E) $A+B$

Problem 5

In multiplying two positive integers a and b , Ron reversed the digits of the two-digit number a . His erroneous product was 161. What is the correct value of the product of a and b ?

Ron 在把 2 个正整数 a 和 b 相乘时，将两位数 a 的个位和十位数字弄反了，导致最后错误的乘积为 161。那么 a 和 b 相乘所得正确的乘积是多少？

- (A) 116 (B) 161 (C) 204 (D) 214 (E) 224

Problem 6

On Halloween Casper ate $\frac{1}{3}$ of his candies and then gave 2 candies to his brother. The next day he ate $\frac{1}{3}$ of his remaining candies and then gave 4 candies to his sister. On the third day he ate his final 8 candies. How many candies did Casper have at the beginning?

在万圣节这天，Casper 吃掉了他的糖果总量的 $\frac{1}{3}$ ，并且给了他弟弟 2 个。第二天他吃掉了剩下糖果的 $\frac{1}{3}$ ，并且给了他妹妹 4 个。在第三天他把剩余的 8 颗糖果都吃完了。那么最初 Casper 有多少颗糖果？

- (A) 30 (B) 39 (C) 48 (D) 57 (E) 66

Problem 7

The sum of two angles of a triangle is $\frac{6}{5}$ of a right angle, and one of these two angles is 30° larger than the other. What is the degree measure of the largest angle in the triangle?

一个三角形的两个内角之和是直角度数的 $\frac{6}{5}$, 并且这两个内角中其中一个角比另一个角大 30° 。那么这个三角形中最大的角的度数是多少度?

- (A) 69 (B) 72 (C) 90 (D) 102 (E) 108

Problem 8

At a certain beach if it is at least $80^\circ F$ and sunny, then the beach will be crowded. On June 10 the beach was not crowded. What can be concluded about the weather conditions on June 10?

在某个沙滩, 若气温至少是 $80^\circ F$ 且晴朗, 则沙滩会挤满人。在 6 月 10 号这天, 沙滩没有挤满人。则我们可以推断 6 月 10 号这天的天气是什么样的?

- (A) The temperature was cooler than $80^\circ F$ and it was not sunny.

温度低于 $80^\circ F$ 且不晴朗。

- (B) The temperature was cooler than $80^\circ F$ or it was not sunny.

温度低于 $80^\circ F$ 或者不晴朗。

- (C) If the temperature was at least $80^\circ F$, then it was sunny.

若温度至少 $80^\circ F$, 则那天天气晴朗。

- (D) If the temperature was cooler than $80^\circ F$, then it was sunny.

若温度低于 $80^\circ F$, 则那天天气晴朗。

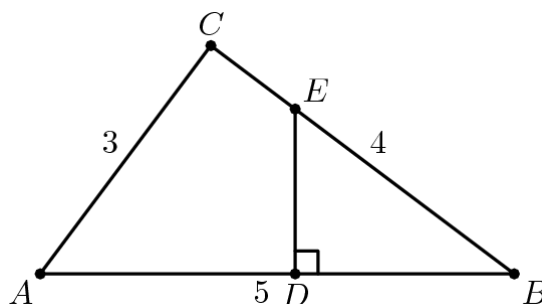
- (E) If the temperature was cooler than $80^\circ F$, then it was not sunny.

若温度低于 $80^\circ F$, 则那天天气不晴朗。

Problem 9

The area of $\triangle EBD$ is one third of the area of $3-4-5 \triangle ABC$. Segment DE is perpendicular to segment AB . What is BD ?

$\triangle EBD$ 的面积是 $3-4-5 \triangle ABC$ 面积的三分之一。线段 DE 垂直线段 AB 。那么 BD 长为多少?



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

Problem 10

Consider the set of numbers $\{1, 10, 10^2, 10^3, \dots, 10^{10}\}$. The ratio of the largest element of the set to the sum of the other ten elements of the set is closest to which integer?

考虑集合 $\{1, 10, 10^2, 10^3, \dots, 10^{10}\}$ 。则集合里最大的元素和其他 10 个元素之和的比值最接近哪个整数?

- (A) 1 (B) 9 (C) 10 (D) 11 (E) 101

Problem 11

There are 52 people in a room. What is the largest value of n such that the statement "At least n people in this room have birthdays falling in the same month" is always true?

房间里有 52 人。使得命题“这个房间里至少有 n 个人的生日在同一个月”正确的 n 的最小值是多少?

- (A) 2 (B) 3 (C) 4 (D) 5 (E) 12

Problem 12

Keiko walks once around a track at exactly the same constant speed every day. The sides of the track are straight, and the ends are semicircles. The track has a width of 6 meters, and it takes her 36 seconds longer to walk around the outside edge of the track than around the inside edge. What is Keiko's speed in meters per second?

Keiko 每天都以同样的速度绕跑道走一圈。跑道的两边是直线，两端是半圆。跑道的宽为 6 米，她沿着跑道的外沿走一圈比沿着内沿走多花 36 秒。那么 Keiko 的速度是多少米每秒？

- (A) $\frac{\pi}{3}$ (B) $\frac{2\pi}{3}$ (C) π (D) $\frac{4\pi}{3}$ (E) $\frac{5\pi}{3}$

Problem 13

Two real numbers are selected independently at random from the interval $[-20, 10]$. What is the probability that the product of those numbers is greater than zero?

从区间 $[-20, 10]$ 内独立且随机的选择两个实数，那么这两个数的乘积大于 0 的概率是多少？

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

Problem 14

A rectangular parking lot has a diagonal of 25 meters and an area of 168 square meters. In meters, what is the perimeter of the parking lot?

一个矩形停车场的一条对角线长 25 米，面积为 168 平方米。那么停车场的周长是多少米？

- (A) 52 (B) 58 (C) 62 (D) 68 (E) 70

Problem 15

Let $@$ denote the "averaged with" operation: $a@b = (a+b)/2$. Which of the following distributive laws hold for all numbers x , y , and z ?

令符号 $@$ 表示“求平均”操作： $a@b = (a+b)/2$ 。下面哪个分配率适用于所有的数 x , y 和 z ?

I. $x @ (y + z) = (x @ y) + (x @ z)$

II. $x + (y @ z) = (x + y) @ (x + z)$

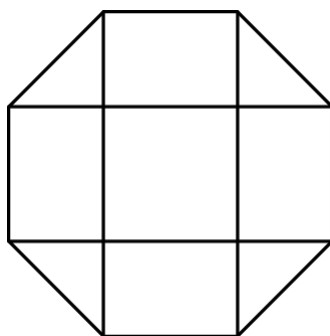
III. $x @ (y @ z) = (x @ y) @ (x @ z)$

(A) I only (B) II only (C) III only (D) I and III only (E) II and III only

Problem 16

A dart board is a regular octagon divided into regions as shown. Suppose that a dart thrown at the board is equally likely to land anywhere on the board. What is the probability that the dart lands within the center square?

一种飞镖盘是一个被分割成如下图所示几个区域的正八边形。假设掷向飞镖盘的飞镖落在盘上任何点都是等可能的，那么飞镖落在位于中心位置的正方形的概率是多少？

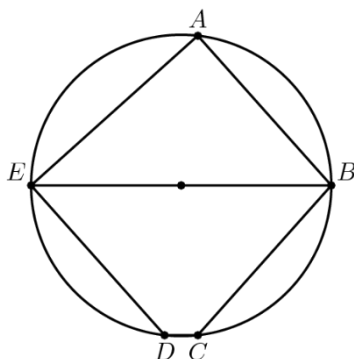


(A) $\frac{\sqrt{2}-1}{2}$ (B) $\frac{1}{4}$ (C) $\frac{2-\sqrt{2}}{2}$ (D) $\frac{\sqrt{2}}{4}$ (E) $2-\sqrt{2}$

Problem 17

In the given circle, the diameter $\overline{EB}$ is parallel to $\overline{DC}$, and $\overline{AB}$ is parallel to $\overline{ED}$. The angles AEB and ABE are in the ratio 4 : 5. What is the degree measure of angle BCD ?

如图所示的圆中，直径 $\overline{EB}$ 平行于 $\overline{DC}$ ， $\overline{AB}$ 平行于 $\overline{ED}$ 。角 AEB 和角 ABE 之比为4:5。问角 BCD 是多少度？



- (A) 120 (B) 125 (C) 130 (D) 135 (E) 140

Problem 18

Rectangle $ABCD$ has $AB = 6$ and $BC = 3$. Point M is chosen on side AB so that $\angle AMD = \angle CMD$. What is the degree measure of $\angle AMD$?

矩形 $ABCD$ 中，边 $AB=6$ ， $BC=3$ 。点 M 在边 AB 上满足 $\angle AMD = \angle CMD$ 。问 $\angle AMD$ 的度数是多少？

- (A) 15 (B) 30 (C) 45 (D) 60 (E) 75

Problem 19

What is the product of all the roots of the equation $\sqrt{5|x| + 8} = \sqrt{x^2 - 16}$.

$\sqrt{5|x| + 8} = \sqrt{x^2 - 16}$ 所有根的乘积是多少？

- (A) -64 (B) -24 (C) -9 (D) 24 (E) 576

Problem 20

Rhombus $ABCD$ has side length 2 and $\angle B = 120^\circ$. Region R consists of all points inside the rhombus that are closer to vertex B than any of the other three vertices. What is the area of R ?

菱形 $ABCD$ 的边长为 2, $\angle B = 120^\circ$ 。菱形内所有相对于顶点 A, C, D 来说, 更靠近顶点 B 的点组成了区域 R 。那么区域 R 的面积是多少?

- (A) $\frac{\sqrt{3}}{3}$ (B) $\frac{\sqrt{3}}{2}$ (C) $\frac{2\sqrt{3}}{3}$ (D) $1 + \frac{\sqrt{3}}{3}$ (E) 2

Problem 21

Brian writes down four integers $w > x > y > z$ whose sum is 44. The pairwise positive differences of these numbers are 1, 3, 4, 5, 6, and 9. What is the sum of the possible values for w ?

Brian 写下了 4 个整数 $w > x > y > z$, 它们的和是 44。这些数两两之间的差的绝对值是 1, 3, 4, 5, 6 和 9。那么 w 的所有可能值的和是多少?

- (A) 16 (B) 31 (C) 48 (D) 62 (E) 93

Problem 22

A pyramid has a square base with sides of length 1 and has lateral faces that are equilateral triangles. A cube is placed within the pyramid so that one face is on the base of the pyramid and its opposite face has all its edges on the lateral faces of the pyramid. What is the volume of this cube?

一个底面是边长为 1 的正方形, 侧面都是等边三角形的四棱锥内有一个正方体, 正方体的一个面位于此棱锥的底面, 而这个面的对面所有的棱都在棱锥的侧面上。则这个正方体的体积是多少?

- (A) $5\sqrt{2} - 7$ (B) $7 - 4\sqrt{3}$ (C) $\frac{2\sqrt{2}}{27}$ (D) $\frac{\sqrt{2}}{9}$ (E) $\frac{\sqrt{3}}{9}$

Problem 23

What is the hundreds digit of 2011^{2011} ?

2011^{2011} 的百位数字是多少?

- (A) 1 (B) 4 (C) 5 (D) 6 (E) 9

Problem 24

A lattice point in an xy -coordinate system is any point (x, y) where both x and y are integers. The graph of $y = mx + 2$ passes through no lattice point with $0 < x \leq 100$ for all m such that $1/2 < m < a$. What is the maximum possible value of a ?

xy 坐标系内的格点是指 x 和 y 均为整数的点 (x, y) 。对于 $0 < x \leq 100$ ，满足 $1/2 < m < a$ 的所有 m ，都能使得 $y = mx + 2$ 的图像不通过任何格点。那么 a 的最大可能值是多少？

- (A) $\frac{51}{101}$ (B) $\frac{50}{99}$ (C) $\frac{51}{100}$ (D) $\frac{52}{101}$ (E) $\frac{13}{25}$

Problem 25

Let T_1 be a triangle with sides 2011, 2012, and 2013. For $n \geq 1$, if $T_n = \triangle ABC$ and D, E , and F are the points of tangency of the incircle of $\triangle ABC$ to the sides AB, BC and AC , respectively, then T_{n+1} is a triangle with side lengths AD, BE , and CF , if it exists. What is the perimeter of the last triangle in the sequence (T_n) ?

T_1 是个边长为 2011, 2012 和 2013 的三角形。对于 $n \geq 1$ ，若 $T_n = \triangle ABC$ 且点 D, E, F 是 $\triangle ABC$ 的内切圆分别和边 AB, BC ，和 AC 相切的切点，那么 T_{n+1} 是以线段 AD, BE 和 CF 为三边的三角形（如果 T_{n+1} 存在的话）。问数列 (T_n) 中最后一个三角形的周长是多少？

- (A) $\frac{1509}{8}$ (B) $\frac{1509}{32}$ (C) $\frac{1509}{64}$ (D) $\frac{1509}{128}$ (E) $\frac{1509}{256}$

2011 AMC 10B Answer Key

1	2	3	4	5	6	7	8	9	10	11	12	13
C	E	A	C	E	A	B	B	D	B	D	A	D
14	15	16	17	18	19	20	21	22	23	24	25	
C	E	A	C	E	A	C	B	A	D	B	D	

2012 AMC 10B**Problem 1**

Each third-grade classroom at Pearl Creek Elementary has 18 students and 2 rabbits. How many more students than rabbits are there in all 4 of the third-grade classrooms?

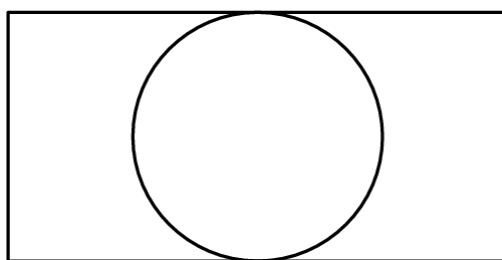
Pearl Creek 小学的每一个三年级教室都有 18 个学生和 2 只兔子，那么四个三年级教室的学生总数比兔子总数多多少个？

- (A) 48 (B) 56 (C) 64 (D) 72 (E) 80

Problem 2

A circle of radius 5 is inscribed in a rectangle as shown. The ratio of the length of the rectangle to its width is 2:1. What is the area of the rectangle?

一个半径为 5 的圆和一个矩形内切，如果所示，矩形的长和宽之比为 2:1。问矩形的面积是多少？



- (A) 50 (B) 100 (C) 125 (D) 150 (E) 200

Problem 3

The point in the xy -plane with coordinates $(1000, 2012)$ is reflected across the line $y = 2000$.

What are the coordinates of the reflected point?

在坐标平面内，坐标为 $(1000, 2012)$ 的点关于直线 $y=2000$ 作对称。那么对称点的坐标是多少？

- (A) $(998, 2012)$ (B) $(1000, 1988)$ (C) $(1000, 2024)$ (D) $(1000, 4012)$ (E) $(1012, 2012)$

Problem 4

When Ringo places his marbles into bags with 6 marbles per bag, he has 4 marbles left over. When Paul does the same with his marbles, he has 3 marbles left over. Ringo and Paul pool their marbles and place them into as many bags as possible, with 6 marbles per bag. How many marbles will be left over?

当 Ringo 把他的玻璃球放入包中，每个包放 6 个，最后还剩 4 个。当 Paul 也用同样方式把他自己的玻璃球放入包中后（每个包放 6 个），他最后还剩 3 个。Ringo 和 Paul 后来把他们各自的玻璃球都混在一起，然后放入尽可能多的包中，每个包仍然放 6 个玻璃球。问最后剩下多少个？

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

Problem 5

Anna enjoys dinner at a restaurant in Washington, D.C., where the sales tax on meals is 10%. She leaves a 15% tip on the price of her meal before the sales tax is added, and the tax is calculated on the pre-tip amount. She spends a total of 27.50 dollars for dinner. What is the cost of her dinner without tax or tip in dollars?

Anna 在华盛顿一家餐馆正在吃晚餐，晚餐的税率是 10%。她给的小费是税前餐费的 15%，并且税费是根据给小费之前的餐费计算的。她这顿晚餐总共花了 27.5 美元。问如果不算税费和小费，晚餐原本费用是多少美元？

- (A) 18 (B) 20 (C) 21 (D) 22 (E) 24

Problem 6

In order to estimate the value of $x - y$ where x and y are real numbers with $x > y > 0$, Xiaoli rounded x up by a small amount, rounded y down by the same amount, and then subtracted her rounded values. Which of the following statements is necessarily correct?

x 和 y 都是实数且 $x > y > 0$ ，为了估计 $x - y$ 的值，Xiaoli 通过把 x 增加一定量使之五入到一个整数，通过把 y 减小同样的量使之四舍到一个整数，然后分别把 x 和 y 四舍五入后的值相减，问下面哪句话是对的？

- (A) Her estimate is larger than $x - y$ | 她的估算比 $x - y$ 大
(B) Her estimate is smaller than $x - y$ | 她的估算比 $x - y$ 小
(C) Her estimate equals $x - y$ | 她的估算等于 $x - y$
(D) Her estimate equals $y - x$ | 她的估算等于 $y - x$
(E) Her estimate is 0 | 她的估算等于 0

Problem 7

For a science project, Sammy observed a chipmunk and a squirrel stashing acorns in holes. The chipmunk hid 3 acorns in each of the holes it dug. The squirrel hid 4 acorns in each of the holes it dug. They each hid the same number of acorns, although the squirrel needed 4 fewer holes. How many acorns did the chipmunk hide?

为了完成一项科学项目，Sammy 观察花栗鼠和松鼠在洞里藏橡果。花栗鼠在它所挖的每个洞里藏 3 颗橡果，而松鼠在它所挖的每个洞里藏 4 颗橡果。它们藏的橡果的总数一样多，但是松鼠所需要的洞比花栗鼠少 4 个。问花栗鼠藏了多少颗橡果？

- (A) 30 (B) 36 (C) 42 (D) 48 (E) 54

Problem 8

What is the sum of all integer solutions to $1 < (x - 2)^2 < 25$?

不等式 $1 < (x - 2)^2 < 25$ 的所有整数解之和为多少？

- (A) 10 (B) 12 (C) 15 (D) 19 (E) 25

Problem 9

Two integers have a sum of 26. When two more integers are added to the first two integers the sum is 41. Finally when two more integers are added to the sum of the previous four integers the sum is 57. What is the minimum number of odd integers among the 6 integers?

两个整数的和为 26，当在这两个整数的和的基础上，再加上另外两个整数，总和是 41。当在这前 4 个整数之和的基础上，再加上两个整数，和变成 57。问这 6 个整数中，奇数的个数最少是多少？

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

Problem 10

How many ordered pairs of positive integers (M, N) satisfy the equation $\frac{M}{6} = \frac{6}{N}$?

有多少对正整数有序对 (M, N) ，满足方程 $\frac{M}{6} = \frac{6}{N}$?

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

Problem 11

A dessert chef prepares the dessert for every day of a week starting with Sunday. The dessert each day is either cake, pie, ice cream, or pudding. The same dessert may not be served two days in a row. There must be cake on Friday because of a birthday. How many different dessert menus for the week are possible?

一个甜点厨师给一周的每一天都准备了甜点，从周日开始，每天的甜点是蛋糕，馅饼，冰淇淋，或者布丁，不能连续两天都准备同一种甜点。因为周五有生日，所以周五必须是蛋糕，问一周一共有多少种不同的甜点菜单？

- (A) 729 (B) 972 (C) 1024 (D) 2187 (E) 2304

Problem 12

Point B is due east of point A . Point C is due north of point B . The distance between points A and C is $10\sqrt{2}$, and $\angle BAC = 45^\circ$. Point D is 20 meters due north of point C . The distance AD is between which two integers?

点 B 在点 A 的东边，点 C 在点 B 的北边，点 A 和点 C 的距离是 $10\sqrt{2}$ ，且 $\angle BAC = 45^\circ$ 。点 D 在点 C 的北边 20 米处，那么线段 AD 的长度在哪两个整数之间？

- (A) 30 and 31 (B) 31 and 32 (C) 32 and 33 (D) 33 and 34 (E) 34 and 35

Problem 13

It takes Clea 60 seconds to walk down an escalator when it is not operating, and only 24 seconds to walk down the escalator when it is operating. How many seconds does it take Clea to ride down the operating escalator when she just stands on it?

当电梯不运行时，Clea 从电梯走下来需要 60 秒，但是当电梯运行时，他从电梯走下来只要 24 秒，问当电梯运行时，如果 Clea 站在电梯上不动，从电梯下来需要多少秒？

- (A) 36 (B) 40 (C) 42 (D) 48 (E) 52

Problem 14

Two equilateral triangles are contained in a square whose side length is $2\sqrt{3}$. The bases of these triangles are the opposite sides of the square, and their intersection is a rhombus. What is the area of the rhombus?

两个等边三角形位于一个边长为 $2\sqrt{3}$ 的正方形的内部，这两个三角形的底是正方形的对边，它们相交的区域是一个菱形，那么这个菱形的面积是多少？

- (A) $\frac{3}{2}$ (B) $\sqrt{3}$ (C) $2\sqrt{2} - 1$ (D) $8\sqrt{3} - 12$ (E) $\frac{4\sqrt{3}}{3}$

Problem 15

In a round-robin tournament with 6 teams, each team plays one game against each other team, and each game results in one team winning and one team losing. At the end of the tournament, the teams are ranked by the number of games won. What is the maximum number of teams that could be tied for the most wins at the end on the tournament?

在一场有 6 支队伍的循环赛中，每支队伍都要和其他每支队伍打一场比赛，而且每场比赛的结果都是一胜一负。循环赛结束后，6 支队伍按照他们赢得比赛的场数排名。问排名并列第一的队伍最多可以是多少个？

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

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