2007 AMC8

Problem 1

Theresa's parents have agreed to buy her tickets to see her favorite band if she spends an average of 10 hours per week helping around the house for 6 weeks. For the first 5 weeks, she helps around the house for 8, 11, 7, 12 and 10 hours. How many hours must she work during the final week to earn the tickets?

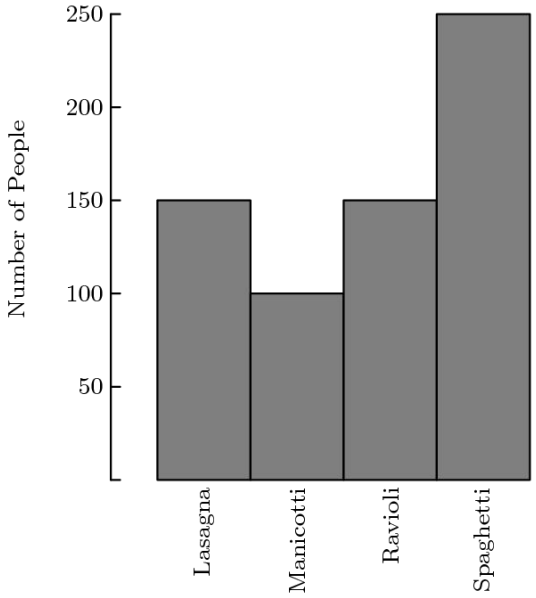
如果特蕾莎平均每周花 10 个小时在家里帮忙，一共帮忙 6 周，那么她的父母就同意给她买票去看她最喜欢的乐队。在最初的 5 周里，她在家里帮忙了 8，11，7，12 和 10 个小时。最后一周她必须工作多少小时才能挣到票？

$\textbf{(A)}\ 9 \qquad \textbf{(B)}\ 10 \qquad \textbf{(C)}\ 11 \qquad \textbf{(D)}\ 12 \qquad \textbf{(E)}\ 13$

Problem 2

Six-hundred fifty students were surveyed about their pasta preferences. The choices were lasagna, manicotti, ravioli and spaghetti. The results of the survey are displayed in the bar graph. What is the ratio of the number of students who preferred spaghetti to the number of students who preferred manicotti?

调查了 650 个学生对意大利面的偏好。可供选择的食物有烤宽而条、意大利通心面、水饺和意大利细面条。调查结果显示在下面条形图中。喜欢意大利细面条的学生人数与喜欢意大利通心面的学生人数的比值是多少？



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

Problem 3

What is the sum of the two smallest prime factors of 250?

250 的最小的两个质因子之和是多少？

$\textbf{(A)}\ 2 \qquad \textbf{(B)}\ 5 \qquad \textbf{(C)}\ 7 \qquad \textbf{(D)}\ 10 \qquad \textbf{(E)}\ 12$

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?

一间闹鬼的房子有 6 扇窗户。Georgie 这只鬼从其中一扇窗口进入房子，再从另一扇不同的窗户离开房子，一共有多少种方法？

$\textbf{(A)}\ 12 \qquad \textbf{(B)}\ 15 \qquad \textbf{(C)}\ 18 \qquad \textbf{(D)}\ 30 \qquad \textbf{(E)}\ 36$

Problem 5

Chandler wants to buy a $\$500$ dollar mountain bike. For his birthday, his grandparents send him $\$50$, his aunt sends him $\$35$ and his cousin gives him $\$15$. He earns $\$16$ 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?

Chandler 想买一辆 500 美元的山地车。在他生日的时候他爷爷奶奶给他 50 美元，阿姨给他 35 美元，表哥给他的 15 美元。另外，他送报每周能赚 16 美元。他将使用他生日收到的全部的钱和他送报赚来的钱来购买山地车，问几周后他能买到这辆山地车？

$\textbf{(A)}\ 24 \qquad \textbf{(B)}\ 25 \qquad \textbf{(C)}\ 26 \qquad \textbf{(D)}\ 27 \qquad \textbf{(E)}\ 28$

Problem 6

The average cost of a long-distance call in the USA in 1985 was 41 cents per minute, and the average cost of a long-distance call in the USA in 2005 was 7 cents per minute. Find the approximate percent decrease in the cost per minute of a long-distance call.

1985 年在美国打长途电话的平均费用是每分钟 41 美分，2005 年在美国打长途电话的平均费用是每分钟 7 美分。求长途电话每分钟费用减少的大致百分比。

$\textbf{(A)}\ 7 \qquad \textbf{(B)}\ 17 \qquad \textbf{(C)}\ 34 \qquad \textbf{(D)}\ 41 \qquad \textbf{(E)}\ 80$

Problem 7

The average age of 5 people in a room is 30 years. An 18-year-old person leaves the room. What is the average age of the four remaining people?

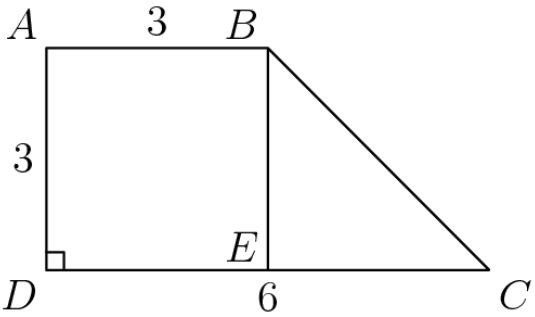
一个房间里 5 个人的平均年龄是 30 岁。一个 18 岁的人离开了这个房间。那么剩下的 4 人平均年龄是多少岁？

(A) 25 **(B)** 26 **(C)** 29 **(D)** 33 **(E)** 36

Problem 8

In trapezoid $ABCD$, AD is perpendicular to DC, $AD = AB = 3$, and $DC = 6$. In addition, E is on DC, and BE is parallel to AD. Find the area of ΔBEC.

在梯形 *ABCD* 中，线段 *AD* 和线段 *DC* 垂直，*AD*＝*AB*＝3，*DC*＝6。另外，E 在线段 *DC* 上，*BE* 平行于 *AD*。求△*BEC* 的面积。



(A) 3 **(B)** 4.5 **(C)** 6 **(D)** 9 **(E)** 18

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?

为完成下面的表格，要求数字 1 到 4 中的每个数字在表格的每一行和每一列都必须出现 1 次。则表格的右下角方格里的数字是多少？

1		2	
2	3		
			4

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

Problem 10

For any positive integer n, define $\boxed{n}$ to be the sum of the positive factors of n. For example, $\boxed{6} = 1 + 2 + 3 + 6 = 12$.Find $\boxed{\boxed{11}}$.

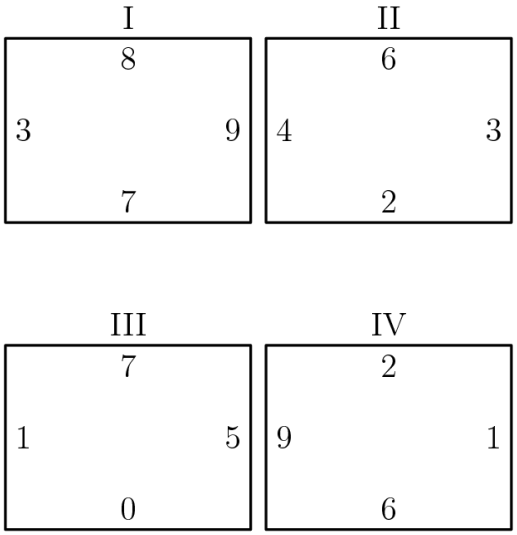
对于任何正整数 n，定义 $\boxed{n}$ 为 n 的正因子之和。例如，$\boxed{6} = 1 + 2 + 3 + 6 = 12$。求 $\boxed{\boxed{11}}$。

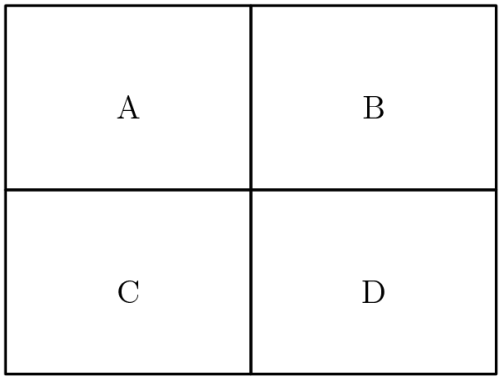
(A) 13 **(B)** 20 **(C)** 24 **(D)** 28 **(E)** 30

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?

瓷砖 I，II，III 和 IV 被平移至与长方形 A，B，C，D 重合。排列完毕后，要求两块相邻的瓷砖的公共边上的数必须相等。那么哪块瓷砖平移到了长方形 C 上？



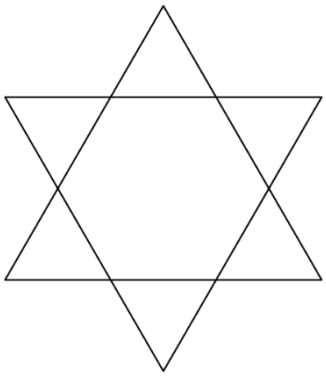


(A) I (B) II (C) III (D) IV (E) cannot be determined

Problem 12

A unit hexagon is composed of a regular haxagon of side length 1 and its equilateral triangular extensions, as shown in the diagram. What is the ratio of the area of the extensions to the area of the original hexagon?

一个单位六角星由一个边长为 1 的正六边形及其 6 个等边三角形形状的凸出部分组成，如图所示。则凸出部分的总面积与原来六边形的面积之比是多少？

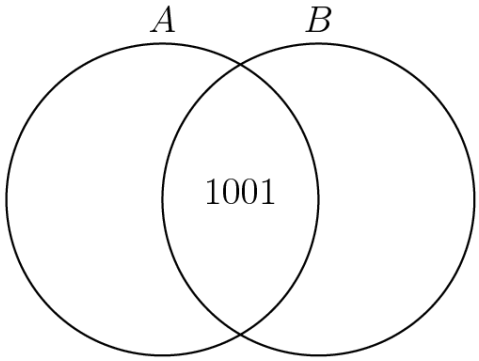


(A) $1:1$ **(B)** $6:5$ **(C)** $3:2$ **(D)** $2:1$ **(E)** $3:1$

Problem 13

Sets A and B, shown in the venn diagram, have the same number of elements. Their union has 2007 elements and their intersection has 1001 elements. Find the number of elements in A.

如下图所示的文氏图中，集合 A 和集合 B 中的元素个数相等。它们的并集有 2007 个元素，且它们的交集有 1001 个元素。那么求集合 A 中的元素个数。



(A) 503 **(B)** 1006 **(C)** 1504 **(D)** 1507 **(E)** 1510

Problem 14

The base of isosceles $\triangle ABC$ is 24 and its area is 60. What is the length of one of the congruent sides?

等腰三角形△*ABC*的底是 24，面积为 60。那么它的一条腰长是多少？

$\textbf{(A)}\ 5 \qquad \textbf{(B)}\ 8 \qquad \textbf{(C)}\ 13 \qquad \textbf{(D)}\ 14 \qquad \textbf{(E)}\ 18$

Problem 15

Let a, b and c be numbers with $0 < a < b < c$. Which of the following is impossible?

a，b，c是三个满足$0 < a < b < c$的实数。下面哪个选项不可能？

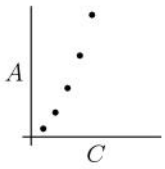
$\textbf{(A)}\ a + c < b \qquad \textbf{(B)}\ a \cdot b < c \qquad \textbf{(C)}\ a + b < c \qquad \textbf{(D)}\ a \cdot c < b \qquad \textbf{(E)}\ \frac{b}{c} = a$

Problem 16

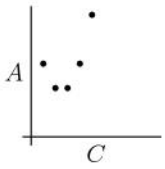
Amanda Reckonwith draws five circles with radii 1, 2, 3, 4 and 5. Then for each circle she plots the point (C; A), where C is its circumference and A is its area. Which of the following could be her graph?

Amanda 画了 5 个半径分别是 1，2，3，4 和 5 的圆。对于每个圆，她画了点（C，A），其中是这个园的周长，A 表示这个圆的面积。下面哪个可能是她画的图像？

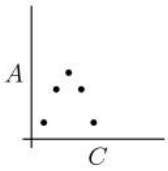
(A)



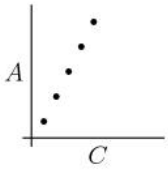
(B)



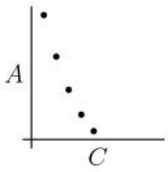
(C)



(D)



(E)



Problem 17

A mixture of 30 liters of paint is 25% red tint, 30% yellow tint, and 45% water. Five liters of yellow tint are added to the original mixture. What is the percent of yellow tint that is the mixture?

一种 30 升的油漆混合物是由 25%的红色颜料，30%的黄色颜料和 45%的水组成。向原来混合物中再加入 5 升黄色颜料，那么新的混合物中黄色颜科所占的百分比是多少？

$\textbf{(A)}\ 25 \qquad \textbf{(B)}\ 35 \qquad \textbf{(C)}\ 40 \qquad \textbf{(D)}\ 45 \qquad \textbf{(E)}\ 50$

Problem 18

The product of the two 99-digit numbers

$$303,030,303,\ldots,030,303 \text{ and } 505,050,505,\ldots,050,505$$

has thousands digit A and units digit B. What is the sum of A and B?

两个 99 位数字 303, 030, 303, ⋯, 030, 303 和 505, 050, 505, ⋯, 050, 505 的乘积的千位数字为 A，个位数字是 B。那么 A 与 B 的和是多少？

$\textbf{(A)}\ 3 \qquad \textbf{(B)}\ 5 \qquad \textbf{(C)}\ 6 \qquad \textbf{(D)}\ 8 \qquad \textbf{(E)}\ 10$

Problem 19

Pick two consecutive positive integers whose sum is less than 100. Square both of those integers and then find the difference of the squares. Which of the following could be the difference?

选择两个连续的正整数，使得它们的和小于 100。将这两个整数平方后再相减，则下面哪个可能是所得到的差？

$\textbf{(A)}\ 2 \qquad \textbf{(B)}\ 64 \qquad \textbf{(C)}\ 79 \qquad \textbf{(D)}\ 96 \qquad \textbf{(E)}\ 131$

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?

在地区赛之前，独角兽队已经赢得了他们所打过的篮球比赛的 45%。在地区赛期间，他们又赢了六场比赛，输了两场，最终整个赛季赢得了一半的比赛。则独角兽队总共打了多少场比赛？

(A) 48 **(B)** 50 **(C)** 52 **(D)** 54 **(E)** 60

Problem 21

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

从 4 张标有 *A，B，C，D* 的红牌和 4 张标有 *A，B，C，D* 的绿牌中选择 2 张牌。一对获胜的牌是指两张同色的牌或者两张字母一样的牌。那么抽到的 2 张牌是一对获胜的牌的概率是多少？

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

Problem 22

A lemming sits at a corner of a square with side length 10 meters. The lemming runs 6.2 meters along a diagonal toward the opposite corner. It stops, makes a 90° right turn and runs 2 more meters. A scientist measures the shortest distance between the lemming and each side of the square. What is the average of these four distances in meters?

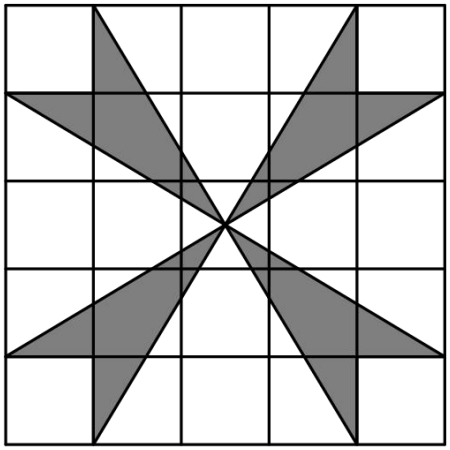
一只旅鼠坐在一个边长为 10 米的正方形的某个角落里。旅鼠沿着对角线朝对面的角落跑了 6.2 米，然后停下来，右转 90 度，又继续跑了 2 米。一位科学家测量了旅鼠和正方形各边之间的最短距离。这四段距离的平均值是多少米？

(A) 2 **(B)** 4.5 **(C)** 5 **(D)** 6.2 **(E)** 7

Problem 23

What is the area of the shaded pinwheel shown in the 5×5 grid?

下面 5×5 的网格中，阴影部分的面积是多少？



$\textbf{(A)}\ 4 \qquad \textbf{(B)}\ 6 \qquad \textbf{(C)}\ 8 \qquad \textbf{(D)}\ 10 \qquad \textbf{(E)}\ 12$

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?

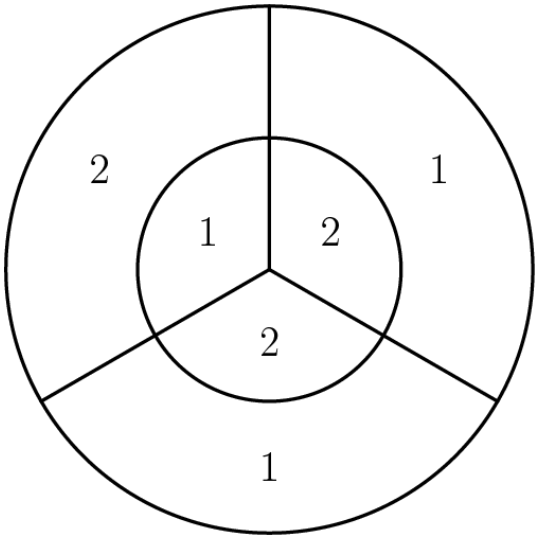
一个包中有 4 张分别标有数字 1，2，3，4 的纸片，每个数字都不重复。从中不放回的选择 3 张纸片，构成一个三位数。则这个三位数是 3 的倍数的概率是多少？

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

Problem 25

On the dart board shown in the figure, the outer circle has radius 6 and the inner circle has radius 3. Three radii divide each circle into the 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. What 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?

在如下图所示的飞镖盘上，外圈的半径为 6，内圈的半径为 3。三个半径将每个圆分成三个全等区域，每个区域的分值如图所示。飞镖击中给定区域的概率与该区域的面积成正比。当两个飞镖击中此飞镖盘时，总分为所击中的各区域的分值之和。则总分为奇数的概率是多少？



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

2007 AMC 8 Answer Key

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