2010 AMC8

Problem 1

At Euclid Middle School, the mathematics teachers are Miss Germain, Mr. Newton, and Mrs. Young. There are 11 students in Mrs. Germain's class, 8 students in Mr. Newton's class, and 9 students in Mrs. Young's class taking the AMC 8 this year. How many mathematics students at Euclid Middle School are taking the contest?

在欧几里得中学，数学老师是 Germain 小姐，Newton 先生和 Young 女士。Germain 小姐班上的 11 位学生，Newton 先生班上的 8 位学生和 Young 女士班上的 9 位学生今年参加 AMC8 竞赛。那么欧几里得中学今年有多少学数学的学生会参加这次竞赛？

$\textbf{(A)}\ 26 \qquad \textbf{(B)}\ 27 \qquad \textbf{(C)}\ 28 \qquad \textbf{(D)}\ 29 \qquad \textbf{(E)}\ 30$

Problem 2

If $a@b = \dfrac{a \times b}{a + b}$ for a, b positive integers, then what is $5@10$?

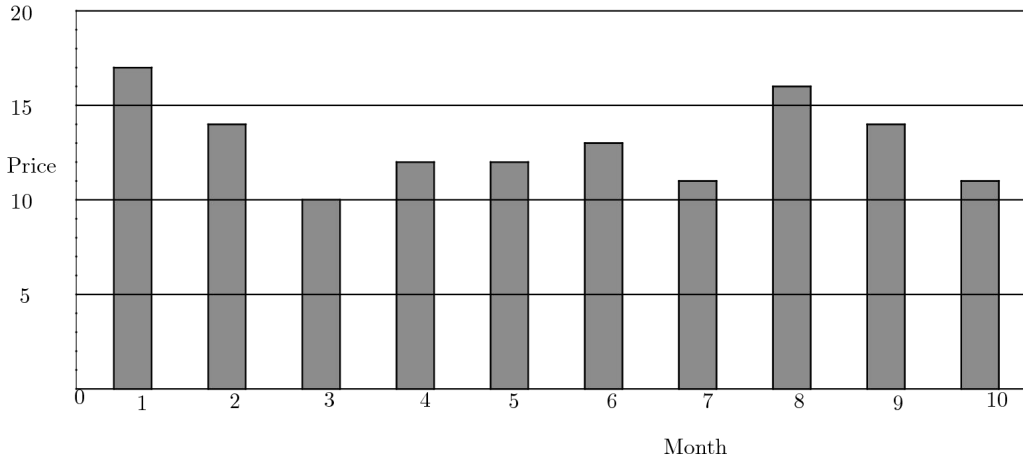
对于 a，b 为正整数，如果有 $a@b = \dfrac{a \times b}{a + b}$，那么 5@10 是多少？

$\textbf{(A)}\ \dfrac{3}{10} \qquad \textbf{(B)}\ 1 \qquad \textbf{(C)}\ 2 \qquad \textbf{(D)}\ \dfrac{10}{3} \qquad \textbf{(E)}\ 50$

Problem 3

The graph shows the price of five gallons of gasoline during the first ten months of the year. By what percent is the highest price more than the lowest price?

下图显示了前 10 个月 5 加仑汽油的价格。那么最高价比最低价多百分之几？



(A) 50 **(B)** 62 **(C)** 70 **(D)** 89 **(E)** 100

Problem 4

What is the sum of the mean, median, and mode of the numbers $2, 3, 0, 3, 1, 4, 0, 3$?

数字 2，3，0，3，1，4，0，3 的平均数，中位数，众数之和是多少？

(A) 6.5 **(B)** 7 **(C)** 7.5 **(D)** 8.5 **(E)** 9

Problem 5

Alice needs to replace a light bulb located 10 centimeters below the ceiling in her kitchen. The ceiling is 2.4 meters above the floor. Alice is 1.5 meters tall and can reach 46 centimeters above the top of her head. Standing on a stool, she can just reach the light bulb. What is the height of the stool, in centimeters?

Alice 需要换掉厨房的一个灯泡，灯泡位于天花板下面 10 厘米，天花板离地面 2.4 米。Alice 有 1.5 米高，并且可以碰到离她头顶 46 厘米高的地方。当她站在凳子上，她恰好可以碰到灯泡。那么凳子的高度是多少厘米？

(A) 32 **(B)** 34 **(C)** 36 **(D)** 38 **(E)** 40

Problem 6

Which of the following figures has the greatest number of lines of symmetry?

下面哪个图形对称轴的个数最多？

（A）equilateral triangle丨等边三角形

（B）non-square rhombus丨非正方形的菱形

（C）non-square rectangle丨非正方形的矩形

（D）isosceles trapezoid丨等腰梯形

（E）square丨正方形

Problem 7

Using only pennies, nickels, dimes, and quarters, what is the smallest number of coins Freddie would need so he could pay any amount of money less than a dollar?

如果仅使用便士（1 分）、五分镍币、一角硬币（10 分）和 25 分硬币，Freddie 可以用于支付少于一美元的任何金额所需的硬币的最小数量是多少？

(A) 6 **(B)** 10 **(C)** 15 **(D)** 25 **(E)** 99

Problem 8

As Emily is riding her bicycle on a long straight road, she spots Emerson skating in the same direction $1/2$ mile in front of her. After she passes him, she can see him in her rear mirror until he is $1/2$ mile behind her. Emily rides at a constant rate of 12 miles per hour, and Emerson skates at a constant rate of 8 miles per hour. For how many minutes can Emily see Emerson?

当 Emily 在一条长直公路上骑着她的自行车时，她发现前方 1/2 英里处 Emerson 正朝着同方向滑冰。当她经过他以后，她可以一直在后视镜里看到他，直到他在她后方 1/2 英里处。Emily 骑车的速度是 12 英里每小时，而 Emerson 滑冰的速度是 8 英里每小时。那么 Emily 在多少分钟内可以一直看到 Emerson？

(A) 6 **(B)** 8 **(C)** 12 **(D)** 15 **(E)** 16

Problem 9

Ryan got 80% of the problems correct on a 25-problem test, 90% on a 40-problem test, and 70% on a 10-problem test. What percent of all the problems did Ryan answer correctly?

Ryan 在一次总共 25 题的考试里，做对 80%的题目，总共 40 题的考试里，做对 90%的题，在总共 10 题的考试里，做对 70%的题。那么总的来说，Ryan 所有的题的正确率是多少？

$\textbf{(A)}\ 64 \qquad \textbf{(B)}\ 75 \qquad \textbf{(C)}\ 80 \qquad \textbf{(D)}\ 84 \qquad \textbf{(E)}\ 86$

Problem 10

Six pepperoni circles will exactly fit across the diameter of a 12-inch pizza when placed. If a total of 24 circles of pepperoni are placed on this pizza without overlap, what fraction of the pizza is covered by pepperoni?

当把 6 个意大利香肠圈放在一个 12 英寸的比萨饼上时，正好可以穿过比萨饼的直径。若把 24 个意大利香肠圈没有重叠的放在这块比萨饼上，那么整块比萨饼被意大利香肠圈覆盖的比例是多少？

$\textbf{(A)}\ \frac{1}{2} \qquad \textbf{(B)}\ \frac{2}{3} \qquad \textbf{(C)}\ \frac{3}{4} \qquad \textbf{(D)}\ \frac{5}{6} \qquad \textbf{(E)}\ \frac{7}{8}$

Problem 11

The top of one tree is 16 feet higher than the top of another tree. The heights of the two trees are in the ratio $3:4$. In feet, how tall is the taller tree?

一棵树的顶部比另一棵树的顶部高 16 英尺。这两棵树的高度之比是 3：4。那么较高的那棵树高多少英尺？

$\textbf{(A)}\ 48 \qquad \textbf{(B)}\ 64 \qquad \textbf{(C)}\ 80 \qquad \textbf{(D)}\ 96 \qquad \textbf{(E)}\ 112$

Problem 12

Of the 500 balls in a large bag, 80% are red and the rest are blue. How many of the red balls must be removed from the bag so that 75% of the remaining balls are red?

一个大包里的 500 个球中，有 80%是红球，其他是蓝球。需要从包中移走多少红球，使得包中剩下的球中，75%是红球？

$\textbf{(A)}\ 25 \qquad \textbf{(B)}\ 50 \qquad \textbf{(C)}\ 75 \qquad \textbf{(D)}\ 100 \qquad \textbf{(E)}\ 150$

Problem 13

The lengths of the sides of a triangle in inches are three consecutive integers. The length of the shortest side is 30% of the perimeter. What is the length of the longest side?

一个三角形的三条边长（单位：英寸）是 3 个连续的正整数。最短的边长是周长的 30%。那么最长的边长是多少？

$\textbf{(A)}\ 7 \qquad \textbf{(B)}\ 8 \qquad \textbf{(C)}\ 9 \qquad \textbf{(D)}\ 10 \qquad \textbf{(E)}\ 11$

Problem 14

What is the sum of the prime factors of 2010?

2010 的质因子之和是多少？

$\textbf{(A)}\ 67 \qquad \textbf{(B)}\ 75 \qquad \textbf{(C)}\ 77 \qquad \textbf{(D)}\ 201 \qquad \textbf{(E)}\ 210$

Problem 15

A jar contains five different colors of gumdrops: 30% are blue, 20% are brown, 15% red, 10% yellow, and the other 30 gumdrops are green. If half of the blue gumdrops are replaced with brown gumdrops, how many gumdrops will be brown?

一个罐子装有 5 种不同颜色的口香糖：30%是蓝色的，20%是棕色的，15%是红色的，10%是黄色的，且其他 30 个口香糖是绿色的。若蓝色口香糖的一半被棕色口香糖代替，那么有多少个口香糖将是棕色的？

$\textbf{(A)}\ 35 \qquad \textbf{(B)}\ 36 \qquad \textbf{(C)}\ 42 \qquad \textbf{(D)}\ 48 \qquad \textbf{(E)}\ 64$

Problem 16

A square and a circle have the same area. What is the ratio of the side length of the square to the radius of the circle?

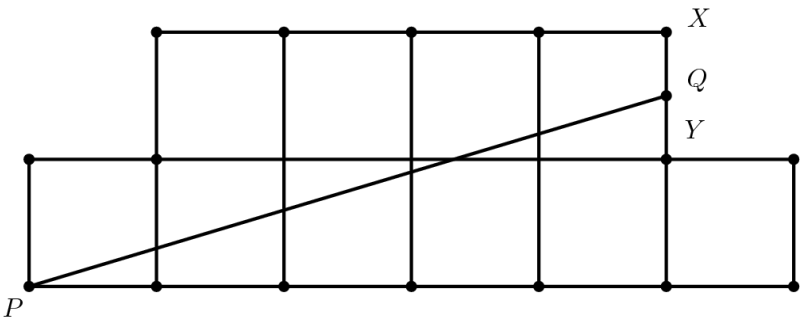
一个正方形和一个圆有相同的面积。那么正方形的边长和圆的半径的比值是多少？

$\textbf{(A)}\ \frac{\sqrt{\pi}}{2} \qquad \textbf{(B)}\ \sqrt{\pi} \qquad \textbf{(C)}\ \pi \qquad \textbf{(D)}\ 2\pi \qquad \textbf{(E)}\ \pi^2$

Problem 17

The diagram shows an octagon consisting of 10 unit squares. The portion below $\overline{PQ}$ is a unit square and a triangle with base 5. If $\overline{PQ}$ bisects the area of the octagon, what is the ratio $\dfrac{XQ}{QY}$?

下图是一个由 10 个单位正方形组成的八边形。位于线段$\overline{PQ}$下面的部分是一个单位正方形和底边长为 5 的三角形。若线段$\overline{PQ}$将八边形的面积平分，那么$\dfrac{XQ}{QY}$的比值是多少？

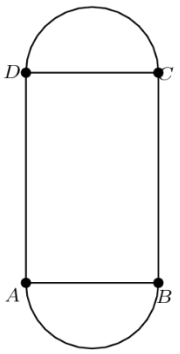


$\textbf{(A)}\ \frac{2}{5}\qquad \textbf{(B)}\ \frac{1}{2}\qquad \textbf{(C)}\ \frac{3}{5}\qquad \textbf{(D)}\ \frac{2}{3}\qquad \textbf{(E)}\ \frac{3}{4}$

Problem 18

A decorative window is made up of a rectangle with semicircles on either end. The ratio of AD to AB is $3:2$, and AB is 30 inches. What is the ratio of the area of the rectangle to the combined areas of the semicircles?

一种装饰性窗户是由一个矩形和位于两端的半圆组成。已知 *AD*：*AB*＝3：2，*AB* 长为 30 英寸，那么矩形的面积和两个半圆面积之和的比值是多少？

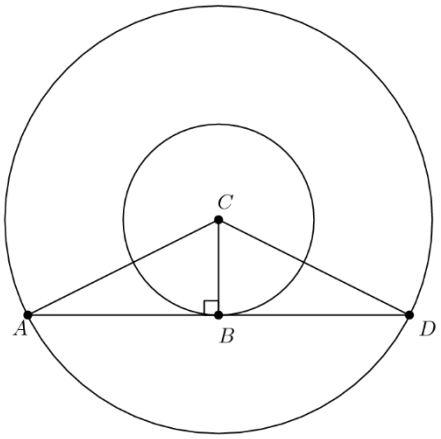


$\textbf{(A)}\ 2:3\qquad \textbf{(B)}\ 3:2\qquad \textbf{(C)}\ 6:\pi\qquad \textbf{(D)}\ 9:\pi\qquad \textbf{(E)}\ 30:\pi$

Problem 19

The two circles pictured have the same center C. Chord $\overline{AD}$ is tangent to the inner circle at B, AC is 10, and chord $\overline{AD}$ has length 16. What is the area between the two circles?

下图中的两个圆是同心圆，圆心均为 C。弦$\overline{AD}$和圆切于 B，AC 长为 10，弦$\overline{AD}$长为 16。那么这两个圆之间区域的面积是多少？



$\textbf{(A)}\ 36\pi \qquad \textbf{(B)}\ 49\pi \qquad \textbf{(C)}\ 64\pi \qquad \textbf{(D)}\ 81\pi \qquad \textbf{(E)}\ 100\pi$

Problem 20

In a room, $2/5$ of the people are wearing gloves, and $3/4$ of the people are wearing hats. What is the minimum number of people in the room wearing both a hat and a glove?

在一个房间里，2/5 的人戴着手套，3/4 的人戴着帽子。那么房间里同时戴着帽子和手套的人最少是多少个？

$\textbf{(A)}\ 3 \qquad \textbf{(B)}\ 5 \qquad \textbf{(C)}\ 8 \qquad \textbf{(D)}\ 15 \qquad \textbf{(E)}\ 20$

Problem 21

Hui is an avid reader. She bought a copy of the best seller *Math is Beautiful*. On the first day, Hui read $1/5$ of the pages plus 12 more, and on the second day she read $1/4$ of the remaining pages plus 15 pages. On the third day she read $1/3$ of the remaining pages plus 18 pages. She then realized that there were only 62 pages left to read, which she read the next day. How many pages are in this book?

Hui 很爱读她买的一本名叫《数学是美丽的》的畅销书，第一天，Hui 读了书的 1/5 再加 12 页，第二天，她读了剩下的 1/4 再加 15 页。第三天，她读了剩余页数的 1/3 再加 18 页。然后她发现还剩 62 页未读，隔天就把这剩下的 62 页读完了。问这本书总共多少页？

$\textbf{(A)}\ 120 \qquad \textbf{(B)}\ 180 \qquad \textbf{(C)}\ 240 \qquad \textbf{(D)}\ 300 \qquad \textbf{(E)}\ 360$

Problem 22

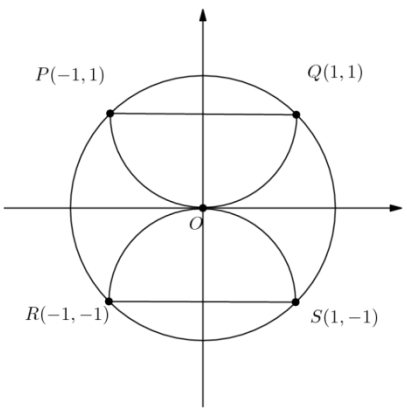
The hundreds digit of a three-digit number is 2 more than the units digit. The digits of the three-digit number are reversed, and the result is subtracted from the original three-digit number. What is the units digit of the result?

一个三位数的百位比个位大 2。把这个三位数的各个位上数字颠倒，然后把原来的三位数减去这个数，所得最终结果的个位数字是多少？

$\textbf{(A)}\ 0 \qquad \textbf{(B)}\ 2 \qquad \textbf{(C)}\ 4 \qquad \textbf{(D)}\ 6 \qquad \textbf{(E)}\ 8$

Problem 23

Semicircles POQ and ROS pass through the center of circle O. What is the ratio of the combined areas of the two semicircles to the area of circle O?



半圆 POQ 和 ROS 通过圆O的圆心。则这两个半圆的面积总和与圆O的面积的比值是多少？

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

Problem 24

What is the correct ordering of the three numbers, 10^8, 5^{12}, and 2^{24}?

下面哪个是10^8, 5^{12} 和 2^{24}这三个数的正确排序？

$\textbf{(A)}\ 2^{24} < 10^8 < 5^{12}$

$\textbf{(B)}\ 2^{24} < 5^{12} < 10^8$

$\textbf{(C)}\ 5^{12} < 2^{24} < 10^8$

$\textbf{(D)}\ 10^8 < 5^{12} < 2^{24}$

$\textbf{(E)}\ 10^8 < 2^{24} < 5^{12}$

Problem 25

Everyday at school, Jo climbs a flight of 6 stairs. Jo can take the stairs 1, 2, or 3 at a time. For example, Jo could climb 3, then 1, then 2. In how many ways can Jo climb the stairs?

Jo 每天在学校里都要爬 6 节楼梯。Jo 可以一次爬 1 节，2 节或者 3 节。例如，J0 可以先一次爬 3 节，然后 1 节，然后 2 节。则 Jo 爬楼梯一共有多少种可能的方法？

$\textbf{(A)}\ 13 \qquad \textbf{(B)}\ 18 \qquad \textbf{(C)}\ 20 \qquad \textbf{(D)}\ 22 \qquad \textbf{(E)}\ 24$

2010 AMC 8 Answer Key

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