

Problem Set - 6 Jan 2025

PROBLEM 1 (2022 AMC 10B #1)

Define $x \diamond y$ to be $|x - y|$ for all real numbers x and y . What is the value of

$$(1 \diamond (2 \diamond 3)) - ((1 \diamond 2) \diamond 3)?$$

- (A) -2 (B) -1 (C) 0 (D) 1 (E) 2

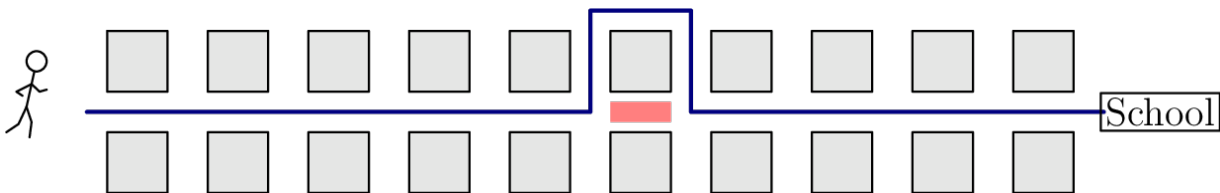
PROBLEM 2 (2015 AMC 10B #3)

Isaac has written down one integer two times and another integer three times. The sum of the five numbers is 100, and one of the numbers is 28. What is the other number?

- (A) 8 (B) 11 (C) 14 (D) 15 (E) 18

PROBLEM 3 (2023 AMC 8 #15)

Viswam walks half a mile to get to school each day. His route consists of 10 city blocks of equal length and he takes 1 minute to walk each block. Today, after walking 5 blocks, Viswam discovers he has to make a detour, walking 3 blocks of equal length instead of 1 block to reach the next corner. From the time he starts his detour, at what speed, in mph, must he walk, in order to get to school at his usual time?



- (A) 4 (B) 4.2 (C) 4.5 (D) 4.8 (E) 5

(NOTE: THE FOLLOWING DIAGRAM WAS NOT SHOWN DURING THE ACTUAL EXAM, BUT IS NOW HERE TO GUIDE STUDENTS IN PICTURING THE PROBLEM)

PROBLEM 4 (2012 AMC 8 #17)

A square with integer side length is cut into 10 squares, all of which have integer side length and at least 8 of which have area 1. What is the smallest possible value of the length of the side of the original square?

- (A) 3 (B) 4 (C) 5 (D) 6 (E) 7

PROBLEM 5 (2021 AMC 12B #4)

Ms. Blackwell gives an exam to two classes. The mean of the scores of the students in the morning class is 84, and the afternoon class's mean score is 70. The ratio of the number of students in the morning class to the number of students in the afternoon class is $\frac{3}{4}$. What is the mean of the scores of all the students?

- (A) 74 (B) 75 (C) 76 (D) 77 (E) 78

PROBLEM 6 (2010 AMC 12B #4)

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?

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

PROBLEM 7 (2010 AMC 10B #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 C. What is $y - x$?

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

PROBLEM 8 (2018 AMC 10B #12)

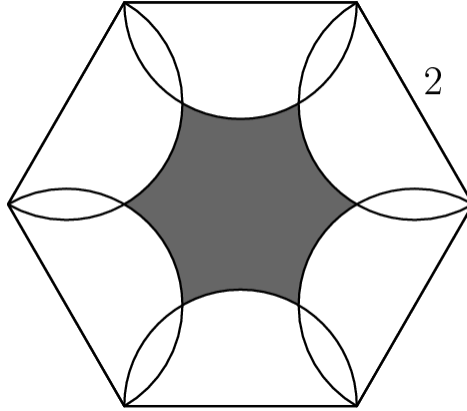
Line segment \overline{AB} is a diameter of a circle with $AB = 24$. Point C , not equal to A or B , lies on the circle. As point C moves around the circle, the centroid (center of mass) of $\triangle ABC$ traces out a closed curve missing two points. To the nearest positive integer, what is the area of the region bounded by this curve?

- (A) 25 (B) 38 (C) 50 (D) 63 (E) 75

PROBLEM 9 (2020 AMC 10B #14)

As shown in the figure below, six semicircles lie in the interior of a regular hexagon with side length 2 so that the diameters of the semicircles coincide with the sides of the hexagon. What is the area of the shaded region ---- inside the hexagon but outside all of the semicircles?

- (A) $6\sqrt{3} - 3\pi$ (B) $\frac{9\sqrt{3}}{2} - 2\pi$ (C) $\frac{3\sqrt{3}}{2} - \frac{\pi}{3}$ (D) $3\sqrt{3} - \pi$ (E) $\frac{9\sqrt{3}}{2} - \pi$

**PROBLEM 10** (2013 AMC 12B #11)

Two bees start at the same spot and fly at the same rate in the following directions. Bee *A* travels 1 foot north, then 1 foot east, then 1 foot upwards, and then continues to repeat this pattern. Bee *B* travels 1 foot south, then 1 foot west, and then continues to repeat this pattern. In what directions are the bees traveling when they are exactly 10 feet away from each other?

- (A) *A* east, *B* west (B) *A* north, *B* south (C) *A* north, *B* west (D) *A* up, *B* south
(E) *A* up, *B* west

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