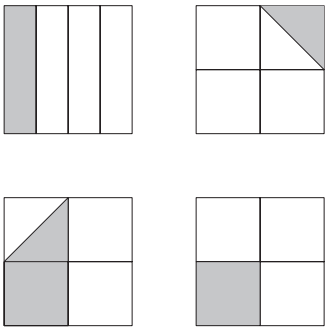
AMC 8 Practice Questions
Example

Each of the following four large congruent squares is subdivided into combinations of congruent triangles or rectangles and is partially shaded. What percent of the total area is partially shaded?



(A) $12\frac{1}{2}$ **(B)** 20 **(C)** 25 **(D)** $33\frac{1}{3}$ **(E)** $37\frac{1}{2}$

The original problem and choices from the 2011 AMC 8 contest

2011 AMC 8, Problem #7—
"Find the shaded portion of each square separately. "

Problem number
Hint

Solution

Answer (C): The upper left and the lower right squares are each one-fourth shaded, for a total of one-half square. The shaded portions of the upper right and lower left squares make up one-half square. So the total shaded area is one full square, which is 25% of the total area.

Solution from official solutions

Difficulty: Medium
SMP-CCSS: 2, 7
CCSS-M: 6G.1, 6RP.3C

Standards for Math Practice
Common Core State Standard

Difficulty, Percent correct

Easy	100-80%
Med Easy	80-60%
Medium	60-40%
Med Hard	40-20%
Hard	20-0%

AMC 8 Practice Questions Continued
13-01

Danica wants to arrange her model cars in rows with exactly 6 cars in each row. She now has 23 model cars. What is the smallest number of additional cars she must buy in order to be able to arrange her cars in this way?

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

2013 AMC 8, Problem #1—
"What is the smallest multiple of 6 that is at least 24?"

Solution

Answer (A): The smallest multiple of 6 that is at least 23 is 24, so Danica must buy 1 additional car.

Difficulty: Easy
SMP-CCSS: 1. Make sense of problems and persevere in solving them; 7. Look for and make use of structure.
CCSS-M: 6.NS.B. Compute fluently with multi-digit numbers and find common factors and multiples.

AMC 8 Practice Questions Continued
13-02

A sign at the fish market says, "50% off, today only: half-pound packages for just $\$3$ per package." What is the regular price for a full pound of fish, in dollars?

(A) 6 **(B)** 9 **(C)** 10 **(D)** 12 **(E)** 15

2013 AMC 8, Problem #2—
"How much does a half-pound package cost at the regular price?"

Solution

Answer (D): A half-pound package costs $3 at the sale price, so it would cost $6 at the regular price. A whole pound would cost $12 at the regular price.

Difficulty: Medium Easy

SMP-CCSS: 1. Make sense of problems and persevere in solving them; 4. Model with mathematics.

CCSS-M: 7.RP.A. Analyze proportional relationships and use them to solve real-world and mathematical problems.

AMC 8 Practice Questions Continued
13-03

What is the value of $4 \cdot (-1+2-3+4-5+6-7+\cdots+1000)$?

(A) -10 **(B)** 0 **(C)** 1 **(D)** 500 **(E)** 2000

2013 AMC 8, Problem #3—
"Find the sum inside the parentheses."

Solution

Answer (E): Inside the parentheses are 500 pairs of numbers, each with a sum of 1. Therefore the expression equals $4 \cdot 500 = 2000$.

Difficulty: Medium
SMP-CCSS: 1. Make sense of problems and persevere in solving them; 7. Look for and make use of structure.
CCSS-M: 7.EE.A. Use properties of operations to generate equivalent expressions.

AMC 8 Practice Questions Continued
13-08

A fair coin is tossed 3 times. What is the probability of at least two consecutive heads?

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

2013 AMC 8, Problem #8—
"List the number of possible equally likely outcomes."

Solution

Answer (C): List the 8 possible equally likely outcomes: HHH, HHT, HTH, HTT, THH, THT, TTH, TTT. Only HHH, HHT, THH have at least 2 consecutive heads, so the probability of at least 2 consecutive heads is $\frac{3}{8}$.

Difficulty: Medium Hard
SMP-CCSS: 1. Make sense of problems and persevere in solving them; 4. Model with mathematics.
CCSS-M: 7.SP.C. Investigate chance processes and develop, use, and evaluate probability models.

AMC 8 Practice Questions Continued
13-10

What is the ratio of the least common multiple of 180 and 594 to the greatest common factor of 180 and 594?

(A) 110 **(B)** 165 **(C)** 330 **(D)** 625 **(E)** 660

2013 AMC 8, Problem #10—
"Find the prime factorization of 180 and 594."

Solution

Answer (C): Because the prime factorizations of 180 and 594 are $2^2 \cdot 3^2 \cdot 5$ and $2 \cdot 3^3 \cdot 11$, respectively, the least common multiple of 180 and 594 is $2^2 \cdot 3^3 \cdot 5 \cdot 11$, and their greatest common factor is $2 \cdot 3^2$. The ratio of their least common multiple to their greatest common factor is $\frac{2^2 \cdot 3^3 \cdot 5 \cdot 11}{2 \cdot 3^2} = 2 \cdot 3 \cdot 5 \cdot 11 = 330$.

Difficulty: Medium Hard
SMP-CCSS: 1. Make sense of problems and persevere in solving them.
CCSS-M: 6.NS.B. Compute fluently with multi-digit numbers and find common factors and multiples.

AMC 8 Practice Questions Continued
13-15

If $3^p + 3^4 = 90$, $2^r + 44 = 76$, and $5^3 + 6^s = 1421$, what is the product of p, r, and s?

(A) 27 **(B)** 40 **(C)** 50 **(D)** 70 **(E)** 90

2013 AMC 8, Problem #15—
"Find the value for p, r and s from the equations given."

Solution

Answer (B): From the first equation, $3^p + 81 = 90$, so $3^p = 9$, and $p = 2$. From the second equation, $2^r = 32$, so $r = 5$. From the third equation, $6^s + 125 = 1421$, so $6^s = 1296$, and $s = 4$. The product of p, r, and s is $2 \cdot 5 \cdot 4 = 40$.

Difficulty: Medium
SMP-CCSS: 1. Make sense of problems and persevere in solving them.
CCSS-M: 8.EE.A Work with radicals and integer exponents.

AMC 8 Practice Questions Continued
13-20

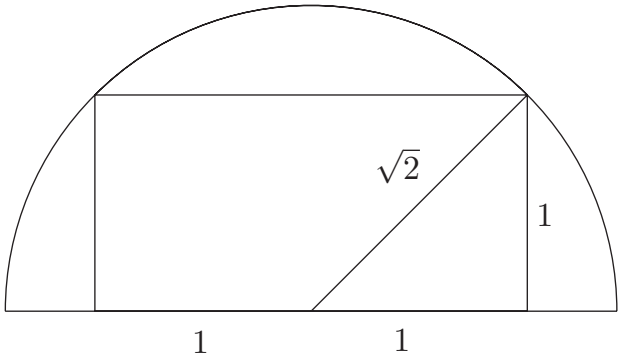
A 1×2 rectangle is inscribed in a semicircle with the longer side on the diameter. What is the area of the semicircle?

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

2013 AMC 8, Problem #20—
"Use the Pythagorean Theorem to find the radius of the semicircle."

Solution

Answer (C):

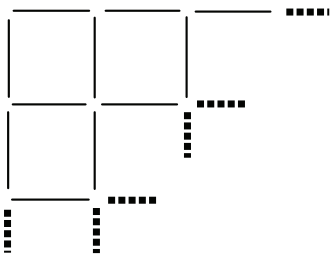


By the Pythagorean Theorem, the radius of the semicircle is $\sqrt{2}$, so its area is $\frac{\pi(\sqrt{2})^2}{2} = \pi$.

Difficulty: Hard
SMP-CCSS: 1. Make sense of problems and persevere in solving them.
CCSS-M: 8.G.B. Understand and apply the Pythagorean Theorem.

AMC 8 Practice Questions Continued
13-22

Toothpicks are used to make a grid that is 60 toothpicks long and 32 toothpicks high. How many toothpicks are used altogether?



(A) 1920 **(B)** 1952 **(C)** 1980 **(D)** 2013 **(E)** 3932

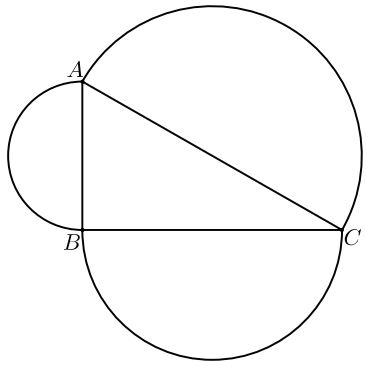
2013 AMC 8, Problem #22—
"Find the number of columns and rows for 60 toothpicks long and 32 toothpicks high."

Solution

Answer (E): A grid 60 toothpicks long and 32 toothpicks high needs 61 columns of 32 toothpicks and 33 rows of 60 toothpicks. Therefore a total of $(61 \times 32) + (33 \times 60) = 3932$ toothpicks are needed.

Difficulty: Hard
SMP-CCSS: 1. Make sense of problems and persevere in solving them; 7. Look for and make use of structure.
CCSS-M: None

Angle ABC of $\triangle ABC$ is a right angle. The sides of $\triangle ABC$ are the diameters of semicircles as shown. The area of the semicircle on $\overline{AB}$ equals 8π, and the arc of the semicircle on $\overline{AC}$ has length 8.5π. What is the radius of the semicircle on $\overline{BC}$?



(A) 7 **(B)** 7.5 **(C)** 8 **(D)** 8.5 **(E)** 9

2013 AMC 8, Problem #23—
"Find the area for the circle with diameter $\overline{AB}$."

Solution

Answer (B): The circle with diameter $\overline{AB}$ has twice the area of the corresponding semicircle; thus the area of the circle is 16π and its radius is 4. Consequently $AB = 8$. The circle with diameter $\overline{AC}$ has circumference 17π, so $AC = 17$. $\overline{AC}$ is the hypotenuse of the right triangle. By the Pythagorean Theorem, $17^2 = 8^2 + (BC)^2$. Therefore $BC = 15$, and the radius is 7.5.

Difficulty: Medium Hard
SMP-CCSS: 1. Make sense of problems and persevere in solving them.
CCSS-M: 8.G.B. Understand and apply the Pythagorean Theorem.