



2003 AMC 10A

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Question 1

Not yet answered

Points out of 5

What is the difference between the sum of the first 2003 even counting numbers and the sum of the first 2003 odd counting numbers?

(A) 0 (B) 1 (C) 2 (D) 2003 (E) 4006

Select one:

- A
- B
- C
- D
- E

Question 2

Not yet answered

Points out of 5

Members of the Rockham Soccer League buy socks and T-shirts. Socks cost \$4 per pair and each T-shirt costs \$5 more than a pair of socks. Each member needs one pair of socks and a shirt for home games and another pair of socks and a shirt for away games. If the total cost is \$2366, how many members are in the League?

(A) 77 (B) 91 (C) 143 (D) 182 (E) 286

Select one:

- A
- B
- C
- D
- E

Question 3

Not yet answered

Points out of 5

A solid box is 15 cm by 10 cm by 8 cm. A new solid is formed by removing a cube 3 cm on a side from each corner of this box. What percent of the original volume is removed?

(A) 4.5% (B) 9% (C) 12% (D) 18% (E) 24%

Select one:

- A
- B
- C
- D
- E

Question 4

Not yet answered

Points out of 5

It takes Mary 30 minutes to walk uphill 1 km from her home to school, but it takes her only 10 minutes to walk from school to her home along the same route. What is her average speed, in km/hr, for the round trip?

- (A) 3 (B) 3.125 (C) 3.5 (D) 4 (E) 4.5

Select one:

- A
 B
 C
 D
 E

Question 5

Not yet answered

Points out of 5

Let d and e denote the solutions of $2x^2 + 3x - 5 = 0$. What is the value of $(d - 1)(e - 1)$?

- (A) $-\frac{5}{2}$ (B) 0 (C) 3 (D) 5 (E) 6

Select one:

- A
 B
 C
 D
 E

Question 6

Not yet answered

Points out of 5

Define $x \heartsuit y$ to be $|x - y|$ for all real numbers x and y . Which of the following statements is not true?

- (A) $x \heartsuit y = y \heartsuit x$ for all x and y
(B) $2(x \heartsuit y) = (2x) \heartsuit (2y)$ for all x and y
(C) $x \heartsuit 0 = x$ for all x
(D) $x \heartsuit x = 0$ for all x
(E) $x \heartsuit y > 0$ if $x \neq y$

Select one:

- A
 B
 C
 D
 E

Question 7

Not yet answered

Points out of 5

How many non-congruent triangles with perimeter 7 have integer side lengths?

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

Select one:

- A
- B
- C
- D
- E

Question 8

Not yet answered

Points out of 5

What is the probability that a randomly drawn positive factor of 60 is less than 7?

- (A)
- $\frac{1}{10}$
- (B)
- $\frac{1}{6}$
- (C)
- $\frac{1}{4}$
- (D)
- $\frac{1}{3}$
- (E)
- $\frac{1}{2}$

Select one:

- A
- B
- C
- D
- E

Question 9

Not yet answered

Points out of 5

Simplify $\sqrt[3]{x\sqrt{x^3\sqrt{x^3\sqrt{x}}}}$.

- (A)
- \sqrt{x}
- (B)
- $\sqrt[3]{x^2}$
- (C)
- $\sqrt[27]{x^2}$
- (D)
- $\sqrt[54]{x}$
- (E)
- $\sqrt[81]{x^{80}}$

Select one:

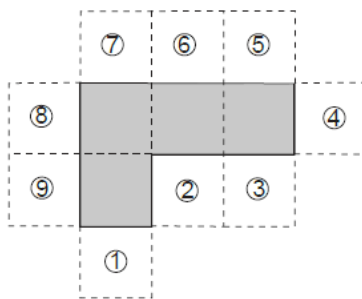
- A
- B
- C
- D
- E

Question 10

Not yet answered

Points out of 5

The polygon enclosed by the solid lines in the figure consists of 4 congruent squares joined edge-to-edge. One more congruent square is attached to an edge at one of the nine positions indicated.



How many of the nine resulting polygons can be folded to form a cube with one face missing?

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

Select one:

- A
- B
- C
- D
- E

Question 11

Not yet answered

Points out of 5

The sum of the two 5-digit numbers $AMC10$ and $AMC12$ is 123422. What is $A + M + C$?

- (A) 10 (B) 11 (C) 12 (D) 13 (E) 14

Select one:

- A
- B
- C
- D
- E

Question 12

Not yet answered

Points out of 5

A point (x, y) is randomly picked from inside the rectangle with vertices $(0, 0)$, $(4, 0)$, $(4, 1)$, and $(0, 1)$. What is the probability that $x < y$?

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

Select one:

- A
 B
 C
 D
 E

Question 13

Not yet answered

Points out of 5

The sum of three numbers is 20. The first is four times the sum of the other two. The second is seven times the third. What is the product of all three?

- (A) 28 (B) 40 (C) 100 (D) 400 (E) 800

Select one:

- A
 B
 C
 D
 E

Question 14

Not yet answered

Points out of 5

Let n be the largest integer that is the product of exactly 3 distinct prime numbers d , e , and $10d + e$, where d and e are single digits. What is the sum of the digits of n ?

- (A) 12 (B) 15 (C) 18 (D) 21 (E) 24

Select one:

- A
 B
 C
 D
 E

Question 15

Not yet answered

Points out of 5

What is the probability that an integer in the set $\{1, 2, 3, \dots, 100\}$ is divisible by 2 and not divisible by 3?

- (A) $\frac{1}{6}$ (B) $\frac{33}{100}$ (C) $\frac{17}{50}$ (D) $\frac{1}{2}$ (E) $\frac{18}{25}$

Select one:

- A
 B
 C
 D
 E

Question 16

Not yet answered

Points out of 5

What is the units digit of 13^{2003} ?

- (A) 1 (B) 3 (C) 7 (D) 8 (E) 9

Select one:

- A
 B
 C
 D
 E

Question 17

Not yet answered

Points out of 5

The number of inches in the perimeter of an equilateral triangle equals the number of square inches in the area of its circumscribed circle. What is the radius, in inches, of the circle?

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

Select one:

- A
 B
 C
 D
 E

Question 18

Not yet answered

Points out of 5

What is the sum of the reciprocals of the roots of the equation $\frac{2003}{2004}x + 1 + \frac{1}{x} = 0$?

- (A) $-\frac{2004}{2003}$ (B) -1 (C) $\frac{2003}{2004}$ (D) 1 (E) $\frac{2004}{2003}$

Select one:

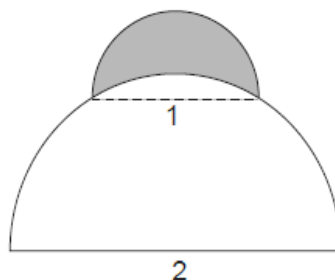
- A
- B
- C
- D
- E

Question 19

Not yet answered

Points out of 5

A semicircle of diameter 1 sits at the top of a semicircle of diameter 2, as shown. The shaded area inside the smaller semicircle and outside the larger semicircle is called a *lune*.



Determine the area of this lune.

- (A) $\frac{1}{6}\pi - \frac{\sqrt{3}}{4}$
- (B) $\frac{\sqrt{3}}{4} - \frac{1}{12}\pi$
- (C) $\frac{\sqrt{3}}{4} - \frac{1}{24}\pi$
- (D) $\frac{\sqrt{3}}{4} + \frac{1}{24}\pi$
- (E) $\frac{\sqrt{3}}{4} + \frac{1}{12}\pi$

Select one:

- A
- B
- C
- D
- E

Question 20

Not yet answered

Points out of 5

A base-10 three digit number n is selected at random. Which of the following is closest to the probability that the base-9 representation and the base-11 representation of n are both three-digit numerals?

(A) 0.3 (B) 0.4 (C) 0.5 (D) 0.6 (E) 0.7

Select one:

- A
- B
- C
- D
- E

Question 21

Not yet answered

Points out of 5

Pat is to select six cookies from a tray containing only chocolate chip, oatmeal, and peanut butter cookies. There are at least six of each of these three kinds of cookies on the tray. How many different assortments of six cookies can be selected?

(A) 22 (B) 25 (C) 27 (D) 28 (E) 729

Select one:

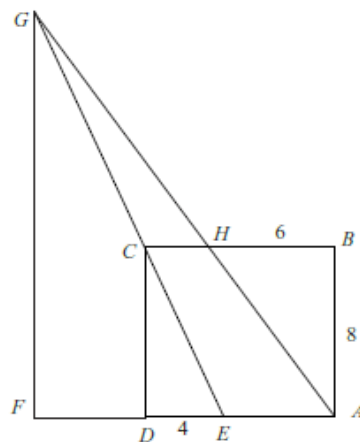
- A
- B
- C
- D
- E

Question 22

Not yet answered

Points out of 5

In rectangle $ABCD$, we have $AB = 8$, $BC = 9$, H is on BC with $BH = 6$, E is on AD with $DE = 4$, line EC intersects line AH at G , and F is on line AD with $GF \perp AF$.



Find the length of GF .

- (A) 16 (B) 20 (C) 24 (D) 28 (E) 30

Select one:

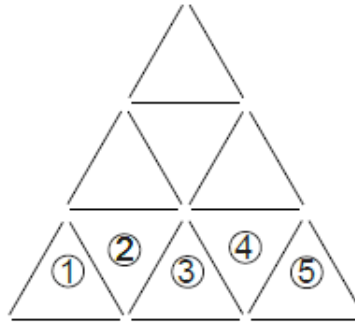
- A
 B
 C
 D
 E

Question 23

Not yet answered

Points out of 5

A large equilateral triangle is constructed by using toothpicks to create rows of small equilateral triangles. For example, in the figure we have 3 rows of small congruent equilateral triangles, with 5 small triangles in the base row.



How many toothpicks would be needed to construct a large equilateral triangle if the base row of the triangle consists of 2003 small equilateral triangles?

- (A) 1,004,004 (B) 1,005,006 (C) 1,507,509 (D) 3,015,018 (E) 6,021,018

Select one:

- A
 B
 C
 D
 E

Question 24

Not yet answered

Points out of 5

Sally has five red cards numbered 1 through 5 and four blue cards numbered 3 through 6. She stacks the cards so that the colors alternate and so that the number on each red card divides evenly into the number on each neighboring blue card. What is the sum of the numbers on the middle three cards?

- (A) 8 (B) 9 (C) 10 (D) 11 (E) 12

Select one:

- A
 B
 C
 D
 E

Question 25

Not yet answered

Points out of 5

Let n be a 5-digit number, and let q and r be the quotient and the remainder, respectively, when n is divided by 100. For how many values of n is $q + r$ divisible by 11?

(A) 8180 (B) 8181 (C) 8182 (D) 9000 (E) 9090

Select one:

- A
- B
- C
- D
- E