



2014 AMC 10A

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Question 1

Not yet answered

Points out of 6

What is $10 \cdot \left(\frac{1}{2} + \frac{1}{5} + \frac{1}{10}\right)^{-1}$?

- (A) 3 (B) 8 (C) $\frac{25}{2}$ (D) $\frac{170}{3}$ (E) 170

Select one:

- A
- B
- C
- D
- E
- Leave blank (1.5 points)

Question 2

Not yet answered

Points out of 6

Roy's cat eats $\frac{1}{3}$ of a can of cat food every morning and $\frac{1}{4}$ of a can of cat food every evening. Before feeding his cat on Monday morning, Roy opened a box containing 6 cans of cat food. On what day of the week did the cat finish eating all the cat food in the box?

- (A) Tuesday (B) Wednesday (C) Thursday (D) Friday (E) Saturday

Select one:

- A
- B
- C
- D
- E
- Leave blank (1.5 points)

Question 3

Not yet answered

Points out of 6

Bridget bakes 48 loaves of bread for her bakery. She sells half of them in the morning for \$2.50 each. In the afternoon she sells two thirds of what she has left, and because they are not fresh, she charges only half price. In the late afternoon she sells the remaining loaves at a dollar each. Each loaf costs \$0.75 for her to make. In dollars, what is her profit for the day?

- (A) 24 (B) 36 (C) 44 (D) 48 (E) 52

Select one:

- A
- B
- C
- D
- E
- Leave blank (1.5 points)

Question 4

Not yet answered

Points out of 6

Walking down Jane Street, Ralph passed four houses in a row, each painted a different color. He passed the orange house before the red house, and he passed the blue house before the yellow house. The blue house was not next to the yellow house. How many orderings of the colored houses are possible?

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

Select one:

- A
- B
- C
- D
- E
- Leave blank (1.5 points)

Question 5

Not yet answered

Points out of 6

On an algebra quiz, 10% of the students scored 70 points, 35% scored 80 points, 30% scored 90 points, and the rest scored 100 points. What is the difference between the mean and median score of the students' scores on this quiz?

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

Select one:

- A
- B
- C
- D
- E
- Leave blank (1.5 points)

Question 6

Not yet answered

Points out of 6

Suppose that a cows give b gallons of milk in c days. At this rate, how many gallons of milk will d cows give in e days?

(A) $\frac{bde}{ac}$ (B) $\frac{ac}{bde}$ (C) $\frac{abde}{c}$ (D) $\frac{bcde}{a}$ (E) $\frac{abc}{de}$

Select one:

- A
- B
- C
- D
- E
- Leave blank (1.5 points)

Question 7

Not yet answered

Points out of 6

Nonzero real numbers x , y , a , and b satisfy $x < a$ and $y < b$. How many of the following inequalities must be true?

(I) $x + y < a + b$

(II) $x - y < a - b$

(III) $xy < ab$

(IV) $\frac{x}{y} < \frac{a}{b}$

(A) 0 **(B)** 1 **(C)** 2 **(D)** 3 **(E)** 4

Select one:

- A**
- B**
- C**
- D**
- E**
- Leave blank (1.5 points)**

Question 8

Not yet answered

Points out of 6

Which of the following number is a perfect square?

(A) $\frac{14!15!}{2}$ **(B)** $\frac{15!16!}{2}$ **(C)** $\frac{16!17!}{2}$ **(D)** $\frac{17!18!}{2}$ **(E)** $\frac{18!19!}{2}$

Select one:

- A**
- B**
- C**
- D**
- E**
- Leave blank (1.5 points)**

Question 9

Not yet answered

Points out of 6

The two legs of a right triangle, which are altitudes, have lengths $2\sqrt{3}$ and 6. How long is the third altitude of the triangle?

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

Select one:

- A**
- B**
- C**
- D**
- E**
- Leave blank (1.5 points)**

Question 10

Not yet answered

Points out of 6

Five positive consecutive integers starting with a have average b . What is the average of 5 consecutive integers that start with b ?

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

Select one:

- A
- B
- C
- D
- E
- Leave blank (1.5 points)

Question 11

Not yet answered

Points out of 6

A customer who intends to purchase an appliance has three coupons, only one of which may be used:

Coupon 1: 10% off the listed price if the listed price is at least \$50

Coupon 2: \$20 off the listed price if the listed price is at least \$100

Coupon 3: 18% off the amount by which the listed price exceeds \$100

For which of the following listed prices will coupon 1 offer a greater price reduction than either coupon 2 or coupon 3?

- (A) \$179.95 (B) \$199.95 (C) \$219.95 (D) \$239.95 (E) \$259.95

Select one:

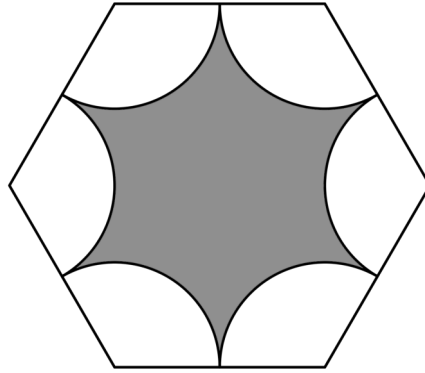
- A
- B
- C
- D
- E
- Leave blank (1.5 points)

Question 12

Not yet answered

Points out of 6

A regular hexagon has side length 6. Congruent arcs with radius 3 are drawn with the center at each of the vertices, creating circular sectors as shown. The region inside the hexagon but outside the sectors is shaded as shown.



What is the area of the shaded region?

- (A) $27\sqrt{3} - 9\pi$ (B) $27\sqrt{3} - 6\pi$ (C) $54\sqrt{3} - 18\pi$ (D) $54\sqrt{3} - 12\pi$ (E) $108\sqrt{3} - 9\pi$

Select one:

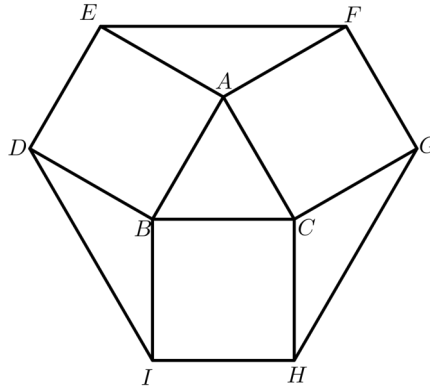
- A
- B
- C
- D
- E
- Leave blank (1.5 points)

Question 13

Not yet answered

Points out of 6

Equilateral $\triangle ABC$ has side length 1, and squares $ABDE$, $BCHI$, $CAFG$ lie outside the triangle.



What is the area of hexagon $DEFGHI$?

- (A) $\frac{12 + 3\sqrt{3}}{4}$ (B) $\frac{9}{2}$ (C) $3 + \sqrt{3}$ (D) $\frac{6 + 3\sqrt{3}}{2}$ (E) 6

Select one:

- A
 B
 C
 D
 E
 Leave blank (1.5 points)

Question 14

Not yet answered

Points out of 6

The y -intercepts, P and Q , of two perpendicular lines intersecting at the point $A(6, 8)$ have a sum of zero. What is the area of $\triangle APQ$?

- (A) 45 (B) 48 (C) 54 (D) 60 (E) 72

Select one:

- A
 B
 C
 D
 E
 Leave blank (1.5 points)

Question 15

Not yet answered

Points out of 6

David drives from his home to the airport to catch a flight. He drives 35 miles in the first hour, but realizes that he will be 1 hour late if he continues at this speed. He increases his speed by 15 miles per hour for the rest of the way to the airport and arrives 30 minutes early. How many miles is the airport from his home?

(A) 140 (B) 175 (C) 210 (D) 245 (E) 280

Select one:

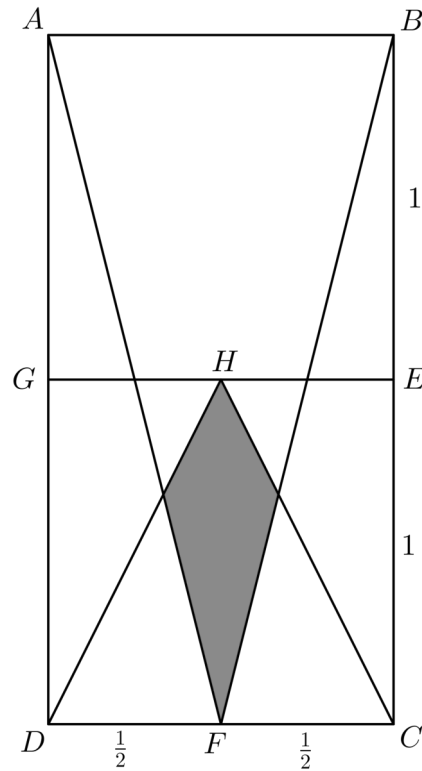
- A
- B
- C
- D
- E
- Leave blank (1.5 points)

Question 16

Not yet answered

Points out of 6

In rectangle $ABCD$, $AB = 1$, $BC = 2$, and points E , F , and G are midpoints of \overline{BC} , \overline{CD} , and \overline{AD} respectively. Point H is the midpoint of \overline{GE} .



What is the area of the shaded region?

- (A) $\frac{1}{12}$ (B) $\frac{\sqrt{3}}{18}$ (C) $\frac{\sqrt{2}}{12}$ (D) $\frac{\sqrt{3}}{12}$ (E) $\frac{1}{6}$

Select one:

- A
- B
- C
- D
- E
- Leave blank (1.5 points)

Question 17

Not yet answered

Points out of 6

Three fair six-sided dice are rolled. What is the probability that the values shown on two of the dice sum to the value shown on the remaining die?

- (A) $\frac{1}{6}$ (B) $\frac{13}{72}$ (C) $\frac{7}{36}$ (D) $\frac{5}{24}$ (E) $\frac{2}{9}$

Select one:

- A
- B
- C
- D
- E
- Leave blank (1.5 points)

Question 18

Not yet answered

Points out of 6

A square in the coordinate plane has vertices whose y -coordinates are 0, 1, 4, and 5. What is the area of the square?

- (A) 16 (B) 17 (C) 25 (D) 26 (E) 27

Select one:

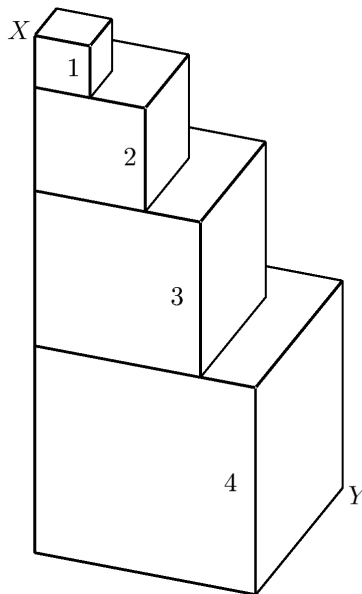
- A
- B
- C
- D
- E
- Leave blank (1.5 points)

Question 19

Not yet answered

Points out of 6

Four cubes with edge lengths 1, 2, 3, and 4 are stacked as shown. What is the length of the portion of \overline{XY} contained in the cube with edge length 3?



- (A) $\frac{3\sqrt{33}}{5}$ (B) $2\sqrt{3}$ (C) $\frac{2\sqrt{33}}{3}$ (D) 4 (E) $3\sqrt{2}$

Select one:

- A
 B
 C
 D
 E
 Leave blank (1.5 points)

Question 20

Not yet answered

Points out of 6

The product $(8)(888\dots 8)$, where the second factor has k digits, is an integer whose digits have a sum of 1000. What is k ?

- (A) 901 (B) 911 (C) 919 (D) 991 (E) 999

Select one:

- A
 B
 C
 D
 E
 Leave blank (1.5 points)

Question 21

Not yet answered

Points out of 6

Positive integers a and b are such that the graphs of $y = ax + 5$ and $y = 3x + b$ intersect the x -axis at the same point. What is the sum of all possible x -coordinates of these points of intersection?

(A) -20 (B) -18 (C) -15 (D) -12 (E) -8

Select one:

- A
- B
- C
- D
- E
- Leave blank (1.5 points)

Question 22

Not yet answered

Points out of 6

In rectangle $ABCD$, $\overline{AB} = 20$ and $\overline{BC} = 10$. Let E be a point on \overline{CD} such that $\angle CBE = 15^\circ$.

What is \overline{AE} ?

(A) $\frac{20\sqrt{3}}{3}$ (B) $10\sqrt{3}$ (C) 18 (D) $11\sqrt{3}$ (E) 20

Select one:

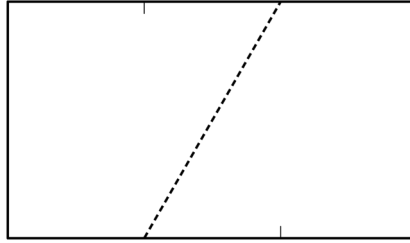
- A
- B
- C
- D
- E
- Leave blank (1.5 points)

Question 23

Not yet answered

Points out of 6

A rectangular piece of paper whose length is $\sqrt{3}$ times the width has area A . The paper is divided into three equal sections along the opposite lengths, and then a dotted line is drawn from the first divider to the second divider on the opposite side as shown. The paper is then folded flat along this dotted line to create a new shape with area B .



What is the ratio $B : A$?

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

Select one:

- A
- B
- C
- D
- E
- Leave blank (1.5 points)

Question 24

Not yet answered

Points out of 6

A sequence of natural numbers is constructed by listing the first 4, then skipping one, listing the next 5, skipping 2, listing 6, skipping 3, and, on the n th iteration, listing $n + 3$ and skipping n . The sequence begins 1, 2, 3, 4, 6, 7, 8, 9, 10, 13. What is the 500,000th number in the sequence?

- (A) 996,506 (B) 996,507 (C) 996,508 (D) 996,509 (E) 996,510

Select one:

- A
- B
- C
- D
- E
- Leave blank (1.5 points)

Question 25

Not yet answered

Points out of 6

The number 5^{867} is between 2^{2013} and 2^{2014} . How many pairs of integers (m, n) are there such that $1 \leq m \leq 2012$ and

$$5^n < 2^m < 2^{m+2} < 5^{n+1}?$$

(A) 278 (B) 279 (C) 280 (D) 281 (E) 282

Select one:

- A
- B
- C
- D
- E
- Leave blank (1.5 points)