



2014 AMC 12A

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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

At the theater children get in for half price. The price for 5 adult tickets and 4 child tickets is 24.50. How much would 8 adult tickets and 6 child tickets cost?

- (A) 35 (B) 38.50 (C) 40 (D) 42 (E) 42.50

Select one:

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

Question 3

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 4

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 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

The difference between a two-digit number and the number obtained by reversing its digits is 5 times the sum of the digits of either number. What is the sum of the two digit number and its reverse?

- (A) 44 (B) 55 (C) 77 (D) 99 (E) 110

Select one:

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

Question 7

Not yet answered

Points out of 6

The first three terms of a geometric progression are $\sqrt{3}$, $\sqrt[3]{3}$, and $\sqrt[6]{3}$. What is the fourth term?

- (A) 1 (B) $\sqrt[7]{3}$ (C) $\sqrt[8]{3}$ (D) $\sqrt[9]{3}$ (E) $\sqrt[10]{3}$

Select one:

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

Question 8

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 9

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 10

Not yet answered

Points out of 6

Three congruent isosceles triangles are constructed with their bases on the sides of an equilateral triangle of side length 1. The sum of the areas of the three isosceles triangles is the same as the area of the equilateral triangle. What is the length of one of the two congruent sides of one of the isosceles triangles?

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

Select one:

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

Question 11

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 12

Not yet answered

Points out of 6

Two circles intersect at points A and B . The minor arcs AB measure 30° on one circle and 60° on the other circle. What is the ratio of the area of the larger circle to the area of the smaller circle?

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

Select one:

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

Question 13

Not yet answered

Points out of 6

A fancy bed and breakfast inn has 5 rooms, each with a distinctive color-coded decor. One day 5 friends arrive to spend the night. There are no other guests that night. The friends can room in any combination they wish, but with no more than 2 friends per room. In how many ways can the innkeeper assign the guests to the rooms?

- (A) 2100 (B) 2220 (C) 3000 (D) 3120 (E) 3125

Select one:

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

Question 14

Not yet answered

Points out of 6

Let $a < b < c$ be three integers such that a, b, c is an arithmetic progression and a, c, b is a geometric progression. What is the smallest possible value of c ?

- (A) -2 (B) 1 (C) 2 (D) 4 (E) 6

Select one:

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

Question 15

Not yet answered

Points out of 6

A five-digit palindrome is a positive integer with respective digits $abcba$, where a is non-zero. Let S be the sum of all five-digit palindromes. What is the sum of the digits of S ?

(A) 9 (B) 18 (C) 27 (D) 36 (E) 45

Select one:

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

Question 16

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:

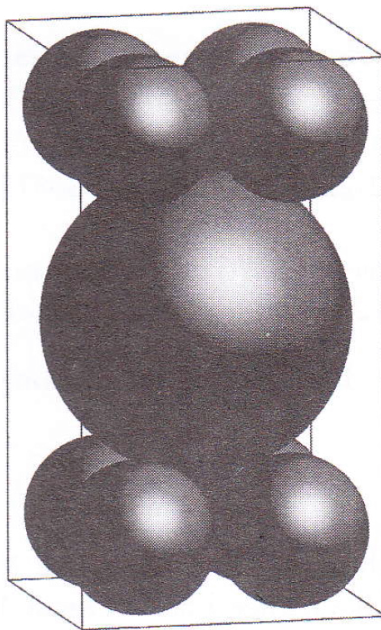
- A
- B
- C
- D
- E
- Leave blank (1.5 points)

Question 17

Not yet answered

Points out of 6

A $4 \times 4 \times h$ rectangular box contains a sphere of radius 2 and eight smaller spheres of radius 1. The smaller spheres are each tangent to three sides of the box, and the larger sphere is tangent to each of the smaller spheres.



What is h ?

- (A) $2 + 2\sqrt{7}$ (B) $3 + 2\sqrt{5}$ (C) $4 + 2\sqrt{7}$ (D) $4\sqrt{5}$ (E) $4\sqrt{7}$

Select one:

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

Question 18

Not yet answered

Points out of 6

The domain of the function $f(x) = \log_{\frac{1}{2}}(\log_4(\log_{\frac{1}{4}}(\log_{16}(\log_{\frac{1}{16}} x))))$ is an interval of length $\frac{m}{n}$, where m and n are relatively prime positive integers. What is $m + n$?

- (A) 19 (B) 31 (C) 271 (D) 319 (E) 511

Select one:

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

Question 19

Not yet answered

Points out of 6

There are exactly N distinct rational numbers k such that $|k| < 200$ and

$$5x^2 + kx + 12 = 0$$

has at least one integer solution for x . What is N ?

- (A) 6 (B) 12 (C) 24 (D) 48 (E) 78

Select one:

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

Question 20

Not yet answered

Points out of 6

In $\triangle BAC$, $\angle BAC = 40^\circ$, $AB = 10$, and $AC = 6$. Points D and E lie on \overline{AB} and \overline{AC} respectively. What is the minimum possible value of $BE + DE + CD$?

- (A) $6\sqrt{3} + 3$ (B) $\frac{27}{2}$ (C) $8\sqrt{3}$ (D) 14 (E) $3\sqrt{3} + 9$

Select one:

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

Question 21

Not yet answered

Points out of 6

For every real number x , let $\lfloor x \rfloor$ denote the greatest integer not exceeding x , and let

$$f(x) = \lfloor x \rfloor (2014^{x - \lfloor x \rfloor} - 1).$$

The set of all numbers x such that $1 \leq x < 2014$ and $f(x) \leq 1$ is a union of disjoint intervals. What is the sum of the lengths of those intervals?

- (A) 1 (B) $\frac{\log 2015}{\log 2014}$ (C) $\frac{\log 2014}{\log 2013}$ (D) $\frac{2014}{2013}$ (E) $2014^{\frac{1}{2014}}$

Select one:

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

Question 22

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)

Question 23

Not yet answered

Points out of 6

The fraction

$$\frac{1}{99^2} = 0.\overline{b_{n-1}b_{n-2} \dots b_2b_1b_0},$$

where n is the length of the period of the repeating decimal expansion. What is the sum $b_0 + b_1 + \dots + b_{n-1}$?

- (A) 874 (B) 883 (C) 887 (D) 891 (E) 892

Select one:

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

Question 24

Not yet answered

Points out of 6

Let $f_0(x) = x + |x - 100| - |x + 100|$, and for $n \geq 1$, let $f_n(x) = |f_{n-1}(x)| - 1$. For how many values of x is $f_{100}(x) = 0$?

- (A) 299 (B) 300 (C) 301 (D) 302 (E) 303

Select one:

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

Question 25

Not yet answered

Points out of 6

The parabola P has focus $(0, 0)$ and goes through the points $(4, 3)$ and $(-4, -3)$. For how many points $(x, y) \in P$ with integer coordinates is it true that $|4x + 3y| \leq 1000$?

(A) 38 (B) 40 (C) 42 (D) 44 (E) 46

Select one:

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