



# 2008 AMC 10B

For more practice and resources, visit [ziml.aretteam.org](http://ziml.aretteam.org)

The problems in the AMC-Series Contests are copyrighted by American Mathematics Competitions at Mathematical Association of America ([www.maa.org](http://www.maa.org)).



**Question 1**

Not yet answered

Points out of 6

A basketball player made 5 baskets during a game. Each basket was worth either 2 or 3 points. How many different numbers could represent the total points scored by the player?

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

Select one:

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

**Question 2**

Not yet answered

Points out of 6

A  $4 \times 4$  block of calendar dates is shown. The order of the numbers in the second row is to be reversed. Then the order of the numbers in the fourth row is to be reversed. Finally, the numbers on each diagonal are to be added. What will be the positive difference between the two diagonal sums?

1	2	3	4
8	9	10	11
15	16	17	18
22	23	24	25

(A) 2      (B) 4      (C) 6      (D) 8      (E) 10

Select one:

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

**Question 3**

Not yet answered

Points out of 6

Assume that  $x$  is a positive real number. Which is equivalent to  $\sqrt[3]{x\sqrt{x}}$ ?

- (A)  $x^{1/6}$     (B)  $x^{1/4}$     (C)  $x^{3/8}$     (D)  $x^{1/2}$     (E)  $x$

Select one:

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

**Question 4**

Not yet answered

Points out of 6

A semipro baseball league has teams with 21 players each. League rules state that a player must be paid at least \$15,000 and that the total of all players' salaries for each team cannot exceed \$700,000. What is the maximum possible salary, in dollars, for a single player?

- (A) 270,000    (B) 385,000    (C) 400,000    (D) 430,000    (E) 700,000

Select one:

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

**Question 5**

Not yet answered

Points out of 6

For real numbers  $a$  and  $b$ , define  $a * b = (a - b)^2$ . What is  $(x - y)^2 * (y - x)^2$ ?

- (A) 0    (B)  $x^2 + y^2$     (C)  $2x^2$     (D)  $2y^2$     (E)  $4xy$

Select one:

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

**Question 6**

Not yet answered

Points out of 6

Points  $B$  and  $C$  lie on  $\overline{AD}$ . The length of  $\overline{AB}$  is 4 times the length of  $\overline{BD}$ , and the length of  $\overline{AC}$  is 9 times the length of  $\overline{CD}$ . The length of  $\overline{BC}$  is what fraction of the length of  $\overline{AD}$ ?

- (A)  $\frac{1}{36}$       (B)  $\frac{1}{13}$       (C)  $\frac{1}{10}$       (D)  $\frac{5}{36}$       (E)  $\frac{1}{5}$

Select one:

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

**Question 7**

Not yet answered

Points out of 6

An equilateral triangle of side length 10 is completely filled in by non-overlapping equilateral triangles of side length 1. How many small triangles are required?

- (A) 10      (B) 25      (C) 100      (D) 250      (E) 1000

Select one:

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

**Question 8**

Not yet answered

Points out of 6

A class collects 50 dollars to buy flowers for a classmate who is in the hospital. Roses cost 3 dollars each, and carnations cost 2 dollars each. No other flowers are to be used. How many different bouquets could be purchased for exactly 50 dollars?

- (A) 1      (B) 7      (C) 9      (D) 16      (E) 17

Select one:

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

**Question 9**

Not yet answered

Points out of 6

A quadratic equation  $ax^2 - 2ax + b = 0$  has two real solutions. What is the average of these two solutions?

- (A) 1      (B) 2      (C)  $\frac{b}{a}$       (D)  $\frac{2b}{a}$       (E)  $\sqrt{2b - a}$

Select one:

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

**Question 10**

Not yet answered

Points out of 6

Points  $A$  and  $B$  are on a circle of radius 5 and  $AB = 6$ . Point  $C$  is the midpoint of the minor arc  $AB$ . What is the length of the line segment  $AC$ ?

- (A)  $\sqrt{10}$       (B)  $\frac{7}{2}$       (C)  $\sqrt{14}$       (D)  $\sqrt{15}$       (E) 4

Select one:

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

**Question 11**

Not yet answered

Points out of 6

Suppose that  $(u_n)$  is a sequence of real numbers satisfying  $u_{n+2} = 2u_{n+1} + u_n$ , and that  $u_3 = 9$  and  $u_6 = 128$ . What is  $u_5$ ?

(A) 40      (B) 53      (C) 68      (D) 88      (E) 104

Select one:

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

**Question 12**

Not yet answered

Points out of 6

Postman Pete has a pedometer to count his steps. The pedometer records up to 99999 steps, then flips over to 00000 on the next step. Pete plans to determine his mileage for a year. On January 1 Pete sets the pedometer to 00000. During the year, the pedometer flips from 99999 to 00000 forty-four times. On December 31 the pedometer reads 50000. Pete takes 1800 steps per mile. Which of the following is closest to the number of miles Pete walked during the year?

(A) 2500      (B) 3000      (C) 3500      (D) 4000      (E) 4500

Select one:

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

**Question 13**

Not yet answered

Points out of 6

For each positive integer  $n$ , the mean of the first  $n$  terms of a sequence is  $n$ . What is the 2008<sup>th</sup> term of the sequence?

- (A) 2008      (B) 4015      (C) 4016      (D) 4,030,056      (E) 4,032,064

Select one:

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

**Question 14**

Not yet answered

Points out of 6

Triangle  $OAB$  has  $O = (0, 0)$ ,  $B = (5, 0)$ , and  $A$  in the first quadrant. In addition,  $\angle ABO = 90^\circ$  and  $\angle AOB = 30^\circ$ . Suppose that  $OA$  is rotated  $90^\circ$  counterclockwise about  $O$ . What are the coordinates of the image of  $A$ ?

- (A)  $\left(-\frac{10}{3}\sqrt{3}, 5\right)$
- (B)  $\left(-\frac{5}{3}\sqrt{3}, 5\right)$
- (C)  $(\sqrt{3}, 5)$
- (D)  $\left(\frac{5}{3}\sqrt{3}, 5\right)$
- (E)  $\left(\frac{10}{3}\sqrt{3}, 5\right)$

Select one:

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

**Question 15**

Not yet answered

Points out of 6

How many right triangles have integer leg lengths  $a$  and  $b$  and a hypotenuse of length  $b + 1$ , where  $b < 100$ ?

- (A) 6      (B) 7      (C) 8      (D) 9      (E) 10

Select one:

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

**Question 16**

Not yet answered

Points out of 6

Two fair coins are to be tossed once. For each head that results, one fair die is to be rolled. What is the probability that the sum of the die rolls is odd? (Note that if no die is rolled, the sum is 0.)

- (A)  $\frac{3}{8}$       (B)  $\frac{1}{2}$       (C)  $\frac{43}{72}$       (D)  $\frac{5}{8}$       (E)  $\frac{2}{3}$

Select one:

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

**Question 17**

Not yet answered

Points out of 6

A poll shows that 70% of all voters approve of the mayor's work. On three separate occasions a pollster selects a voter at random. What is the probability that on exactly one of these three occasions the voter approves of the mayor's work?

- (A) 0.063      (B) 0.189      (C) 0.233      (D) 0.333      (E) 0.441

Select one:

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



**Question 18**

Not yet answered

Points out of 6

Bricklayer Brenda would take nine hours to build a chimney alone, and bricklayer Brandon would take 10 hours to build it alone. When they work together, they talk a lot, and their combined output decreases by 10 bricks per hour. Working together, they build the chimney in 5 hours. How many bricks are in the chimney?

(A) 500      (B) 900      (C) 950      (D) 1000      (E) 1900

Select one:

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

**Question 19**

Not yet answered

Points out of 6

A cylindrical tank with radius 4 feet and height 9 feet is lying on its side. The tank is filled with water to a depth of 2 feet. What is the volume of water, in cubic feet?

(A)  $24\pi - 36\sqrt{2}$

(B)  $24\pi - 24\sqrt{3}$

(C)  $36\pi - 36\sqrt{3}$

(D)  $36\pi - 24\sqrt{2}$

(E)  $48\pi - 36\sqrt{3}$

Select one:

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

**Question 20**

Not yet answered

Points out of 6

The faces of a cubical die are marked with the numbers 1, 2, 2, 3, 3, and 4. The faces of another die are marked with the numbers 1, 3, 4, 5, 6, and 8. What is the probability that the sum of the top two numbers will be 5, 7, or 9?

- (A)  $\frac{5}{18}$       (B)  $\frac{7}{18}$       (C)  $\frac{11}{18}$       (D)  $\frac{3}{4}$       (E)  $\frac{8}{9}$

Select one:

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

**Question 21**

Not yet answered

Points out of 6

Ten chairs are evenly spaced around a round table and numbered clockwise from 1 through 10. Five married couples are to sit in the chairs with men and women alternating, and no one is to sit either next to or across from his/her spouse. How many seating arrangements are possible?

- (A) 240      (B) 360      (C) 480      (D) 540      (E) 720

Select one:

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

**Question 22**

Not yet answered

Points out of 6

Three red beads, two white beads, and one blue bead are placed in line in random order. What is the probability that no two neighboring beads are the same color?

- (A)  $\frac{1}{12}$     (B)  $\frac{1}{10}$     (C)  $\frac{1}{6}$     (D)  $\frac{1}{3}$     (E)  $\frac{1}{2}$

Select one:

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

**Question 23**

Not yet answered

Points out of 6

A rectangular floor measures  $a$  by  $b$  feet, where  $a$  and  $b$  are positive integers and  $b > a$ . An artist paints a rectangle on the floor with the sides of the rectangle parallel to the floor. The unpainted part of the floor forms a border of width 1 foot around the painted rectangle and occupies half the area of the whole floor. How many possibilities are there for the ordered pair  $(a, b)$ ?

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

Select one:

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

**Question 24**

Not yet answered

Points out of 6

Quadrilateral  $ABCD$  has  $AB = BC = CD$ , angle  $ABC = 70$  and angle  $BCD = 170$ . What is the measure of angle  $BAD$ ?

- (A) 75      (B) 80      (C) 85      (D) 90      (E) 95

Select one:

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

**Question 25**

Not yet answered

Points out of 6

Michael walks at the rate of 5 feet per second on a long straight path. Trash pails are located every 200 feet along the path. A garbage truck traveling at 10 feet per second in the same direction as Michael stops for 30 seconds at each pail. As Michael passes a pail, he notices the truck ahead of him just leaving the next pail. How many times will Michael and the truck intersect?

- (A) 4      (B) 5      (C) 6      (D) 7      (E) 8

Select one:

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