



# 2008 AMC 12B

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**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.

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

What will be the positive difference between the two diagonal sums?

(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

A semipro baseball league has teams with 21 players each. League rules state that a player must be paid at least 15,000 dollars, and that the total of all players' salaries for each team cannot exceed 700,000 dollars. 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:

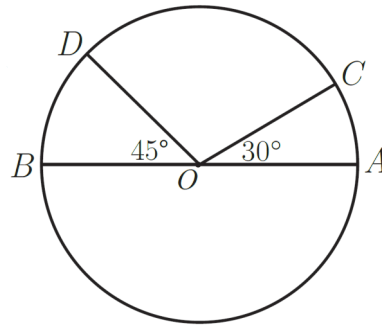
- A
- B
- C
- D
- E
- Leave blank (1.5 points)

**Question 4**

Not yet answered

Points out of 6

On circle  $O$ , points  $C$  and  $D$  are on the same side of diameter  $\overline{AB}$ ,  $\angle AOC = 30^\circ$ , and  $\angle DOB = 45^\circ$ .



What is the ratio of the area of the smaller sector  $COD$  to the area of the circle?

- (A)  $\frac{2}{9}$       (B)  $\frac{1}{4}$       (C)  $\frac{5}{18}$       (D)  $\frac{7}{24}$       (E)  $\frac{3}{10}$

Select one:

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

**Question 5**

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 6**

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 7**

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 8**

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 9**

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 10**

Not yet answered

Points out of 6

Bricklayer Brenda would take 9 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 is decreased 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 11**

Not yet answered

Points out of 6

A cone-shaped mountain has its base on the ocean floor and has a height of 8000 feet. The top  $\frac{1}{8}$  of the volume of the mountain is above water. What is the depth of the ocean at the base of the mountain in feet?

(A) 4000      (B)  $2000(4 - \sqrt{2})$       (C) 6000      (D) 6400      (E) 7000

Select one:

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

**Question 12**

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 2008th term of the sequence?

(A) 2008      (B) 4015      (C) 4016      (D) 4030056      (E) 4032064

Select one:

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

**Question 13**

Not yet answered

Points out of 6

Vertex  $E$  of equilateral  $\triangle ABE$  is in the interior of unit square  $ABCD$ . Let  $R$  be the region consisting of all points inside  $ABCD$  and outside  $\triangle ABE$  whose distance from  $AD$  is between  $\frac{1}{3}$  and  $\frac{2}{3}$ . What is the area of  $R$ ?

- (A)  $\frac{12 - 5\sqrt{3}}{72}$       (B)  $\frac{12 - 5\sqrt{3}}{36}$       (C)  $\frac{\sqrt{3}}{18}$       (D)  $\frac{3 - \sqrt{3}}{9}$       (E)  $\frac{\sqrt{3}}{12}$

Select one:

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

**Question 14**

Not yet answered

Points out of 6

A circle has a radius of  $\log_{10}(a^2)$  and a circumference of  $\log_{10}(b^4)$ . What is  $\log_a b$ ?

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

Select one:

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

**Question 15**

Not yet answered

Points out of 6

On each side of a unit square, an equilateral triangle of side length 1 is constructed. On each new side of each equilateral triangle, another equilateral triangle of side length 1 is constructed. The interiors of the square and the 12 triangles have no points in common. Let  $R$  be the region formed by the union of the square and all the triangles, and  $S$  be the smallest convex polygon that contains  $R$ . What is the area of the region that is inside  $S$  but outside  $R$ ?

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

Select one:

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

**Question 16**

Not yet answered

Points out of 6

A rectangular floor measures  $a$  by  $b$  feet, where  $a$  and  $b$  are positive integers with  $b > a$ . An artist paints a rectangle on the floor with the sides of the rectangle parallel to the sides of the floor. The unpainted part of the floor forms a border of width 1 foot around the painted rectangle and occupies half of the area of the entire 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 17**

Not yet answered

Points out of 6

Let  $A$ ,  $B$  and  $C$  be three distinct points on the graph of  $y = x^2$  such that line  $AB$  is parallel to the  $x$ -axis and  $\triangle ABC$  is a right triangle with area 2008. What is the sum of the digits of the  $y$ -coordinate of  $C$ ?

- (A) 16      (B) 17      (C) 18      (D) 19      (E) 20

Select one:

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

**Question 18**

Not yet answered

Points out of 6

A pyramid has a square base  $ABCD$  and vertex  $E$ . The area of square  $ABCD$  is 196, and the areas of  $\triangle ABE$  and  $\triangle CDE$  are 105 and 91, respectively. What is the volume of the pyramid?

- (A) 392      (B)  $196\sqrt{6}$       (C)  $392\sqrt{2}$       (D)  $392\sqrt{3}$       (E) 784

Select one:

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

**Question 19**

Not yet answered

Points out of 6

A function  $f$  is defined by  $f(z) = (4 + i)z^2 + \alpha z + \gamma$  for all complex numbers  $z$ , where  $\alpha$  and  $\gamma$  are complex numbers and  $i^2 = -1$ . Suppose that  $f(1)$  and  $f(i)$  are both real. What is the smallest possible value of  $|\alpha| + |\gamma|$ ?

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

Select one:

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

**Question 20**

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)

**Question 21**

Not yet answered

Points out of 6

Two circles of radius 1 are to be constructed as follows. The center of circle  $A$  is chosen uniformly and at random from the line segment joining  $(0, 0)$  and  $(2, 0)$ . The center of circle  $B$  is chosen uniformly and at random, and independently of the first choice, from the line segment joining  $(0, 1)$  to  $(2, 1)$ . What is the probability that circles  $A$  and  $B$  intersect?

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

Select one:

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

**Question 22**

Not yet answered

Points out of 6

A parking lot has 16 spaces in a row. Twelve cars arrive, each of which requires one parking space, and their drivers chose spaces at random from among the available spaces. Auntie Em then arrives in her SUV, which requires 2 adjacent spaces. What is the probability that she is able to park?

- (A)  $\frac{11}{20}$     (B)  $\frac{4}{7}$     (C)  $\frac{81}{140}$     (D)  $\frac{3}{5}$     (E)  $\frac{17}{28}$

Select one:

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

**Question 23**

Not yet answered

Points out of 6

The sum of the base-10 logarithms of the divisors of  $10^n$  is 792. What is  $n$ ?

- (A) 11    (B) 12    (C) 13    (D) 14    (E) 15

Select one:

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

**Question 24**

Not yet answered

Points out of 6

Let  $A_0 = (0, 0)$ . Distinct points  $A_1, A_2, \dots$  lie on the  $x$ -axis, and distinct points  $B_1, B_2, \dots$  lie on the graph of  $y = \sqrt{x}$ . For every positive integer  $n$ ,  $A_{n-1}B_nA_n$  is an equilateral triangle. What is the least  $n$  for which the length  $A_0A_n \geq 100$ ?

- (A) 13    (B) 15    (C) 17    (D) 19    (E) 21

Select one:

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

**Question 25**

Not yet answered

Points out of 6

Let  $ABCD$  be a trapezoid with  $AB \parallel CD$ ,  $AB = 11$ ,  $BC = 5$ ,  $CD = 19$ , and  $DA = 7$ . Bisectors of  $\angle A$  and  $\angle D$  meet at  $P$ , and bisectors of  $\angle B$  and  $\angle C$  meet at  $Q$ . What is the area of hexagon  $ABQCDP$ ?

- (A)  $28\sqrt{3}$     (B)  $30\sqrt{3}$     (C)  $32\sqrt{3}$     (D)  $35\sqrt{3}$     (E)  $36\sqrt{3}$

Select one:

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