



# 2007 AMC 12B

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**Question 1**

Not yet answered

Points out of 6

Isabella's house has 3 bedrooms. Each bedroom is 12 feet long, 10 feet wide, and 8 feet high. Isabella must paint the walls of all the bedrooms. Doorways and windows, which will not be painted, occupy 60 square feet in each bedroom. How many square feet of walls must be painted?

(A) 678      (B) 768      (C) 786      (D) 867      (E) 876

Select one:

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

**Question 2**

Not yet answered

Points out of 6

A college student drove his compact car 120 miles home for the weekend and averaged 30 miles per gallon. On the return trip the student drove his parents' SUV and averaged only 20 miles per gallon. What was the average gas mileage, in miles per gallon, for the round trip?

(A) 22      (B) 24      (C) 25      (D) 26      (E) 28

Select one:

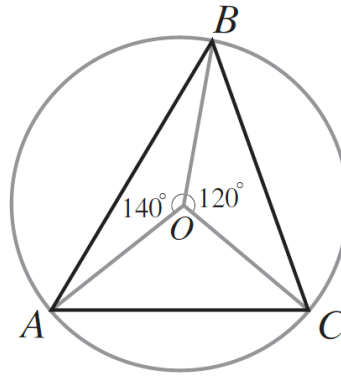
- A
- B
- C
- D
- E
- Leave blank (1.5 points)

**Question 3**

Not yet answered

Points out of 6

The point  $O$  is the center of the circle circumscribed about triangle  $ABC$ , with  $\angle BOC = 120^\circ$  and  $\angle AOB = 140^\circ$ , as shown.



What is the degree measure of  $\angle ABC$ ?

- (A)35    (B)40    (C)45    (D)50    (E)60

Select one:

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

**Question 4**

Not yet answered

Points out of 6

At Frank's Fruit Market, 3 bananas cost as much as 2 apples, and 6 apples cost as much as 4 oranges. How many oranges cost as much as 18 bananas?

- (A)6    (B)8    (C)9    (D)12    (E)18

Select one:

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

**Question 5**

Not yet answered

Points out of 6

The 2007 AMC 12 contests will be scored by awarding 6 points for each correct response, 0 points for each incorrect response, and 1.5 points for each problem left unanswered. After looking over the 25 problems, Sarah has decided to attempt the first 22 and leave the last 3 unanswered. How many of the first 22 problems must she solve correctly in order to score at least 100 points?

(A) 13      (B) 14      (C) 15      (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

Triangle  $ABC$  has side lengths  $AB = 5$ ,  $BC = 6$ , and  $AC = 7$ . Two bugs start simultaneously from  $A$  and crawl along the sides of the triangle in opposite directions at the same speed. They meet at point  $D$ . What is  $BD$ ?

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

Select one:

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

**Question 7**

Not yet answered

Points out of 6

All sides of the convex pentagon  $ABCDE$  are of equal length, and  $\angle A = \angle B = 90^\circ$ . What is the degree measure of  $\angle E$ ?

- (A) 90      (B) 108      (C) 120      (D) 144      (E) 150

Select one:

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

**Question 8**

Not yet answered

Points out of 6

Tom's age is  $T$  years, which is also the sum of the ages of his three children. His age  $N$  years ago was twice the sum of their ages then. What is  $T/N$ ?

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

Select one:

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

**Question 9**

Not yet answered

Points out of 6

A function  $f$  has the property that  $f(3x - 1) = x^2 + x + 1$  for all real numbers  $x$ . What is  $f(5)$ ?

- (A) 7      (B) 13      (C) 31      (D) 111      (E) 211

Select one:

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

**Question 10**

Not yet answered

Points out of 6

Some boys and girls are having a car wash to raise money for a class trip to China. Initially 40% of the group are girls. Shortly thereafter two girls leave and two boys arrive, and then 30% of the group are girls. How many girls were initially in the group?

- (A) 4      (B) 6      (C) 8      (D) 10      (E) 12

Select one:

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

**Question 11**

Not yet answered

Points out of 6

The angles of quadrilateral  $ABCD$  satisfy  $\angle A = 2\angle B = 3\angle C = 4\angle D$ . What is the degree measure of  $\angle A$ , rounded to the nearest whole number?

- (A) 125      (B) 144      (C) 153      (D) 173      (E) 180

Select one:

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

**Question 12**

Not yet answered

Points out of 6

A teacher gave a test to a class in which 10% of the students are juniors and 90% are seniors. The average score on the test was 84. The juniors all received the same score, and the average score of the seniors was 83. What score did each of the juniors receive on the test?

- (A) 85      (B) 88      (C) 93      (D) 94      (E) 98

Select one:

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

**Question 13**

Not yet answered

Points out of 6

A traffic light runs repeatedly through the following cycle: green for 30 seconds, then yellow for 3 seconds, and then red for 30 seconds. Leah picks a random three-second time interval to watch the light. What is the probability that the color changes while she is watching?

- (A)  $\frac{1}{63}$     (B)  $\frac{1}{21}$     (C)  $\frac{1}{10}$     (D)  $\frac{1}{7}$     (E)  $\frac{1}{3}$

Select one:

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

**Question 14**

Not yet answered

Points out of 6

Point  $P$  is inside equilateral  $\triangle ABC$ . Points  $Q$ ,  $R$ , and  $S$  are the feet of the perpendiculars from  $P$  to  $\overline{AB}$ ,  $\overline{BC}$ , and  $\overline{CA}$ , respectively. Given that  $PQ = 1$ ,  $PR = 2$ , and  $PS = 3$ , what is  $AB$ ?

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

Select one:

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

**Question 15**

Not yet answered

Points out of 6

The geometric series  $a + ar + ar^2 \dots$  has a sum of 7, and the terms involving odd powers of  $r$  have a sum of 3. What is  $a + r$ ?

- (A)  $\frac{4}{3}$     (B)  $\frac{12}{7}$     (C)  $\frac{3}{2}$     (D)  $\frac{7}{3}$     (E)  $\frac{5}{2}$

Select one:

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

**Question 16**

Not yet answered

Points out of 6

Each face of a regular tetrahedron is painted either red, white, or blue. Two colorings are considered indistinguishable if two congruent tetrahedra with those colorings can be rotated so that their appearances are identical. How many distinguishable colorings are possible?

- (A)15    (B)18    (C)27    (D)54    (E)81

Select one:

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

**Question 17**

Not yet answered

Points out of 6

If  $a$  is a nonzero integer and  $b$  is a positive number such that  $ab^2 = \log_{10} b$ , what is the median of the set  $\{0, 1, a, b, 1/b\}$ ?

- (A)0    (B)1    (C) $a$     (D) $b$     (E) $\frac{1}{b}$

Select one:

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



**Question 18**

Not yet answered

Points out of 6

Let  $a$ ,  $b$ , and  $c$  be digits with  $a \neq 0$ . The three-digit integer  $abc$  lies one third of the way from the square of a positive integer to the square of the next larger integer. The integer  $acb$  lies two thirds of the way between the same two squares. What is  $a + b + c$ ?

- (A) 10      (B) 13      (C) 16      (D) 18      (E) 21

Select one:

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

**Question 19**

Not yet answered

Points out of 6

Rhombus  $ABCD$ , with side length 6, is rolled to form a cylinder of volume 6 by taping  $\overline{AB}$  to  $\overline{DC}$ . What is  $\sin(\angle ABC)$ ?

- (A)  $\frac{\pi}{9}$       (B)  $\frac{1}{2}$       (C)  $\frac{\pi}{6}$       (D)  $\frac{\pi}{4}$       (E)  $\frac{\sqrt{3}}{2}$

Select one:

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

**Question 20**

Not yet answered

Points out of 6

The parallelogram bounded by the lines  $y = ax + c$ ,  $y = ax + d$ ,  $y = bx + c$ , and  $y = bx + d$  has area 18. The parallelogram bounded by the lines  $y = ax + c$ ,  $y = ax - d$ ,  $y = bx + c$ , and  $y = bx - d$  has area 72. Given that  $a$ ,  $b$ ,  $c$ , and  $d$  are positive integers, what is the smallest possible value of  $a + b + c + d$ ?

(A)13      (B)14      (C)15      (D)16      (E)17

Select one:

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

**Question 21**

Not yet answered

Points out of 6

The first 2007 positive integers are each written in base 3. How many of these base-3 representations are palindromes? (A palindrome is a number that reads the same forward and backward.)

(A) 100      (B) 101      (C) 102      (D) 103      (E) 104

Select one:

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

**Question 22**

Not yet answered

Points out of 6

Two particles move along the edges of equilateral  $\triangle ABC$  in the direction

$$A \Rightarrow B \Rightarrow C \Rightarrow A,$$

starting simultaneously and moving at the same speed. One starts at  $A$ , and the other starts at the midpoint of  $\overline{BC}$ . The midpoint of the line segment joining the two particles traces out a path that encloses a region  $R$ . What is the ratio of the area of  $R$  to the area of  $\triangle ABC$ ?

- (A)  $\frac{1}{16}$     (B)  $\frac{1}{12}$     (C)  $\frac{1}{9}$     (D)  $\frac{1}{6}$     (E)  $\frac{1}{4}$

Select one:

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

**Question 23**

Not yet answered

Points out of 6

How many non-congruent right triangles with positive integer leg lengths have areas that are numerically equal to 3 times their perimeters?

- (A)6    (B)7    (C)8    (D)10    (E)12

Select one:

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

**Question 24**

Not yet answered

Points out of 6

How many pairs of positive integers  $(a, b)$  are there such that  $\gcd(a, b) = 1$  and

$$\frac{a}{b} + \frac{14b}{9a}$$

is an integer?

(A)4 (B)6 (C)9 (D)12 (E)infinitely many

Select one:

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

**Question 25**

Not yet answered

Points out of 6

Points  $A, B, C, D$  and  $E$  are located in 3-dimensional space with  $AB = BC = CD = DE = EA = 2$  and  $\angle ABC = \angle CDE = \angle DEA = 90^\circ$ . The plane of  $\triangle ABC$  is parallel to  $\overline{DE}$ . What is the area of  $\triangle BDE$ ?

(A) $\sqrt{2}$  (B) $\sqrt{3}$  (C)2 (D) $\sqrt{5}$  (E) $\sqrt{6}$

Select one:

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