



2006 AMC 10A

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Question 1

Not yet answered

Points out of 6

Sandwiches at Joe's Fast Food cost \$3 each and sodas cost \$2 each. How many dollars will it cost to purchase 5 sandwiches and 8 sodas?

(A) 31 (B) 32 (C) 33 (D) 34 (E) 35

Select one:

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

Question 2

Not yet answered

Points out of 6

Define $x \otimes y = x^3 - y$. What is $h \otimes (h \otimes h)$?

(A) $-h$ (B) 0 (C) h (D) $2h$ (E) h^3

Select one:

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

Question 3

Not yet answered

Points out of 6

The ratio of Mary's age to Alice's age is 3 : 5. Alice is 30 years old. How old is Mary?

(A) 15 (B) 18 (C) 20 (D) 24 (E) 50

Select one:

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

Question 4

Not yet answered

Points out of 6

A digital watch displays hours and minutes with AM and PM. What is the largest possible sum of the digits in the display?

- (A) 17 (B) 19 (C) 21 (D) 22 (E) 23

Select one:

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

Question 5

Not yet answered

Points out of 6

Doug and Dave shared a pizza with 8 equally-sized slices. Doug wanted a plain pizza, but Dave wanted anchovies on half the pizza. The cost of a plain pizza was 8 dollars, and there was an additional cost of 2 dollars for putting anchovies on one half. Dave ate all the slices of anchovy pizza and one plain slice. Doug ate the remainder. Each paid for what he had eaten. How many more dollars did Dave pay than Doug?

- (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

What non-zero real value for x satisfies $(7x)^{14} = (14x)^7$?

- (A) $\frac{1}{7}$ (B) $\frac{2}{7}$ (C) 1 (D) 7 (E) 14

Select one:

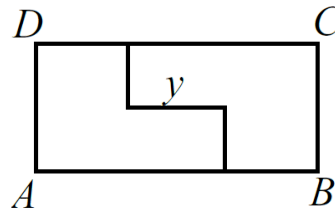
- A
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- D
- E
- Leave blank (1.5 points)

Question 7

Not yet answered

Points out of 6

The 8×18 rectangle $ABCD$ is cut into two congruent hexagons, as shown, in such a way that the two hexagons can be repositioned without overlap to form a square.

What is y ?

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

Select one:

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

Question 8

Not yet answered

Points out of 6

A parabola with equation $y = x^2 + bx + c$ passes through the points $(2, 3)$ and $(4, 3)$. What is c ?

- (A) 2 (B) 5 (C) 7 (D) 10 (E) 11

Select one:

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

Question 9

Not yet answered

Points out of 6

How many sets of two or more consecutive positive integers have a sum of 15?

- (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

For how many real values of x is $\sqrt{120 - \sqrt{x}}$ an integer?

- (A) 3 (B) 6 (C) 9 (D) 10 (E) 11

Select one:

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

Question 11

Not yet answered

Points out of 6

Which of the following describes the graph of the equation $(x + y)^2 = x^2 + y^2$?

- (A) The empty set (B) One point (C) Two lines (D) A circle (E) The entire plane

Select one:

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

Question 12

Not yet answered

Points out of 6

Rolly wishes to secure his dog with an 8-foot rope to a square shed that is 16 feet on each side. His preliminary drawings are shown.



Which of these arrangements give the dog the greater area to roam, and by how many square feet?

- (A) I, by
- 8π
- (B) I, by
- 6π
- (C) II, by
- 4π
- (D) II, by
- 8π
- (E) II, by
- 10π

Select one:

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

Question 13

Not yet answered

Points out of 6

A player pays \$5 to play a game. A die is rolled. If the number on the die is odd, the game is lost. If the number on the die is even, the die is rolled again. In this case the player wins if the second number matches the first and loses otherwise. How much should the player win if the game is fair? (In a fair game the probability of winning times the amount won is what the player should pay.)

(A) \$12 (B) \$30 (C) \$50 (D) \$60 (E) \$100

Select one:

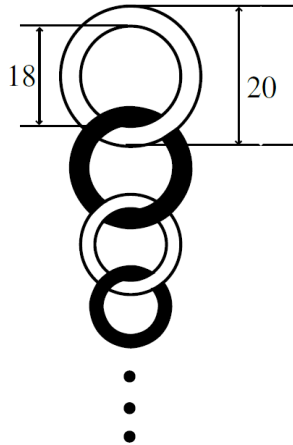
- A
- B
- C
- D
- E
- Leave blank (1.5 points)

Question 14

Not yet answered

Points out of 6

A number of linked rings, each 1 cm thick, are hanging on a peg. The top ring has an outside diameter of 20 cm. The outside diameter of each of the outer rings is 1 cm less than that of the ring above it. The bottom ring has an outside diameter of 3 cm.



What is the distance, in cm, from the top of the top ring to the bottom of the bottom ring?

(A) 171 (B) 173 (C) 182 (D) 188 (E) 210

Select one:

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

Question 15

Not yet answered

Points out of 6

Odell and Kershaw run for 30 minutes on a circular track. Odell runs clockwise at 250 m/min and uses the inner lane with a radius of 50 meters. Kershaw runs counterclockwise at 300 m/min and uses the outer lane with a radius of 60 meters, starting on the same radial line as Odell. How many times after the start do they pass each other?

(A) 29 (B) 42 (C) 45 (D) 47 (E) 50

Select one:

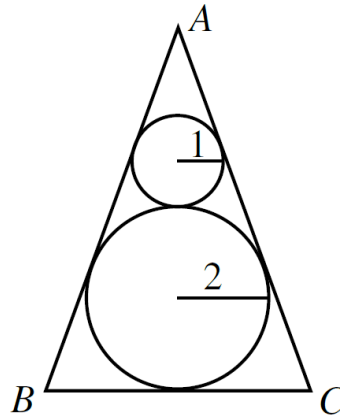
- A
- B
- C
- D
- E
- Leave blank (1.5 points)

Question 16

Not yet answered

Points out of 6

A circle of radius 1 is tangent to a circle of radius 2. The sides of $\triangle ABC$ are tangent to the circles as shown, and the sides \overline{AB} and \overline{AC} are congruent.

What is the area of $\triangle ABC$?

(A) $\frac{35}{2}$ (B) $15\sqrt{2}$ (C) $\frac{64}{3}$ (D) $16\sqrt{2}$ (E) 24

Select one:

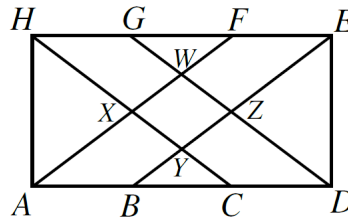
- A
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- C
- D
- E
- Leave blank (1.5 points)

Question 17

Not yet answered

Points out of 6

In rectangle $ADEH$, points B and C trisect \overline{AD} , and points G and F trisect \overline{HE} . In addition, $AH = AC = 2$, and $AD = 3$.



What is the area of quadrilateral $WXYZ$ shown in the figure?

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

Select one:

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

Question 18

Not yet answered

Points out of 6

A license plate in a certain state consists of 4 digits, not necessarily distinct, and 2 letters, also not necessarily distinct. These six characters may appear in any order, except that the two letters must appear next to each other. How many distinct license plates are possible?

- (A) $10^4 \times 26^2$ (B) $10^3 \times 26^3$ (C) $5 \times 10^4 \times 26^2$ (D) $10^2 \times 26^4$ (E) $5 \times 10^3 \times 26^3$

Select one:

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

Question 19

Not yet answered

Points out of 6

How many non-similar triangles have angles whose degree measures are distinct positive integers in arithmetic progression?

- (A) 0 (B) 1 (C) 59 (D) 89 (E) 178

Select one:

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

Question 20

Not yet answered

Points out of 6

Six distinct positive integers are randomly chosen between 1 and 2006, inclusive. What is the probability that some pair of these integers has a difference that is a multiple of 5?

- (A) $\frac{1}{2}$ (B) $\frac{3}{5}$ (C) $\frac{2}{3}$ (D) $\frac{4}{5}$ (E) 1

Select one:

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

Question 21

Not yet answered

Points out of 6

How many four-digit positive integers have at least one digit that is a 2 or a 3?

- (A) 2439 (B) 4096 (C) 4903 (D) 4904 (E) 5416

Select one:

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

Question 22

Not yet answered

Points out of 6

Two farmers agree that pigs are worth 300 dollars and that goats are worth 210 dollars. When one farmer owes the other money, he pays the debt in pigs or goats, with "change" received in the form of goats or pigs as necessary. (For example, a 390 dollar debt could be paid with two pigs, with one goat received in change.) What is the amount of the smallest positive debt that can be resolved in this way?

(A) 5 (B) 10 (C) 30 (D) 90 (E) 210

Select one:

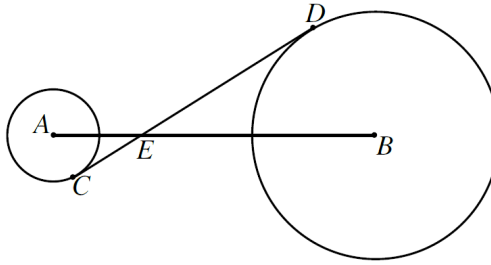
- A
- B
- C
- D
- E
- Leave blank (1.5 points)

Question 23

Not yet answered

Points out of 6

Circles with centers A and B have radii 3 and 8, respectively. A common internal tangent intersects the circles at C and D , respectively. Lines AB and CD intersect at E , and $AE = 5$.

What is CD ?

(A) 13 (B) $\frac{44}{3}$ (C) $\sqrt{221}$ (D) $\sqrt{255}$ (E) $\frac{55}{3}$

Select one:

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

Question 24

Not yet answered

Points out of 6

Centers of adjacent faces of a unit cube are joined to form a regular octahedron. What is the volume of this octahedron?

- (A) $\frac{1}{8}$ (B) $\frac{1}{6}$ (C) $\frac{1}{4}$ (D) $\frac{1}{3}$ (E) $\frac{1}{2}$

Select one:

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

Question 25

Not yet answered

Points out of 6

A bug starts at one vertex of a cube and moves along the edges of the cube according to the following rule. At each vertex the bug will choose to travel along one of the three edges emanating from that vertex. Each edge has equal probability of being chosen, and all choices are independent. What is the probability that after seven moves the bug will have visited every vertex exactly once?

- (A) $\frac{1}{2187}$ (B) $\frac{1}{729}$ (C) $\frac{2}{243}$ (D) $\frac{1}{81}$ (E) $\frac{5}{243}$

Select one:

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