28th Annual AMC 10A

Thursday, November 5, 2026

DO NOT TURN THE PAGE until your Competition Manager tells you to begin.
Please review the following information:

The basics



Figures not always drawn to scale.

How scoring works

Allowed

- Blank scratch paper provided by the Competition Manager
- Rulers and compasses
- Writing utensils and erasers

Not allowed

- Calculators
- Protractors
- Graph paper
- Any device that can send or receive information, such as cell phones, smart watches and smart glasses

Before you begin

1. Confirm that your name is on the answer sheet provided by your Competition Manager.
2. Mark your answers by completely filling the appropriate circles with a No. 2 pencil.
3. Double check for accuracy and erase errors completely. Only answers that are properly marked on the answer sheet and appear sufficiently dark can be scored.

> *Keep it fair:* **Don't share** or discuss the problems or answers until **November 6, 2026**.

Official rules and policies

By participating in this competition, students agree to comply with AMC rules and policies, including the academic integrity policy, which can be found here: **https://maa.org/student-programs/amc/maa-american-mathematics-competitions-policies/**

The problems and solutions for this AMC 10A were prepared by the AMC 10/12 Editorial Board under the direction of Gary Gordon and Carl Yerger, co-Editors-in-Chief.

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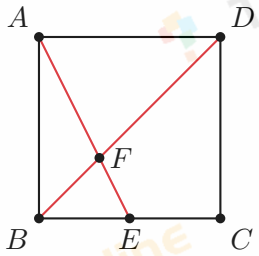
1. Helena's vinyl record collection contains 33 LP records and 45 EP records. An LP record plays for three times as long as an EP record. How many more EP records must Helena buy so that the total playing time of her EP records equals the total playing time of her LP records?

   (A) 45 **(B)** 54 **(C)** 63 **(D)** 78 **(E)** 87

2. A sign in a parking lot states that the total price includes a 27% tax. To the nearest whole number, what percentage of the amount a customer pays is this tax?

   (A) 21% **(B)** 22% **(C)** 27% **(D)** 37% **(E)** 73%

3. Square $ABCD$ has side length 24. Let E be the midpoint of $\overline{BC}$, and let F be the intersection of $\overline{AE}$ and $\overline{BD}$.



   What is the area of $\triangle BEF$?

   (A) 36 **(B)** 40 **(C)** 45 **(D)** 48 **(E)** 52

4. Half of the internal angles of a polygon measure 150° each, and the other half of its internal angles measure 190° each. How many sides does the polygon have?

   (A) 36 **(B)** 40 **(C)** 60 **(D)** 72 **(E)** 180

5. Let $a_1, a_2, a_3, \ldots$ be a sequence with $a_1 = 94$, $a_2 = 190$, and a_n equal to the arithmetic mean of the previous $n-1$ terms for $n \geq 3$. What is the value of a_{10}?

   (A) 47 **(B)** 95 **(C)** 142 **(D)** 284 **(E)** 564

6. A triangle with sides 16, 30, and 34 is inscribed in a circle, dividing the interior of the circle into four regions. Let A, B, and C be the areas of the non-triangular regions, with C being the greatest. What is the value of $A + B$?

   (A) $\frac{289}{2}\pi - 240$ **(B)** $\frac{289}{2}\pi - 210$ **(C)** $289\pi - 480$ **(D)** $289\pi - 360$ **(E)** $289\pi - 240$

7. How many ordered triples of positive integers (x, y, z) satisfy both of the following equations?

$$x + y + z = 31$$
$$x + 3y + 3z = 41$$

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

8. A driver sees an electronic highway sign stating that the next exit is 7 miles away and it will take 5 minutes to reach it. Assume both numbers have been rounded to the nearest integer. Among the following options, what is the lowest speed limit (in miles per hour) that would possibly allow the driver to legally reach the exit within the given time frame?

(A) 65 **(B)** 70 **(C)** 75 **(D)** 80 **(E)** 85

9. Two similar but not congruent scalene triangles each have a side with length 9 and a side with length 12. What is the length of the longest side of the larger triangle?

(A) 12 **(B)** 14 **(C)** 15 **(D)** 16 **(E)** 17

10. For what odd positive integer n is the mean of $1, 4, 9, 16, \ldots, n^2$ exactly 32% greater than its median?

(A) 19 **(B)** 39 **(C)** 49 **(D)** 89 **(E)** 169

11. Gary writes down six distinct positive integers: 2, 5, 24, 60, 240, and a three-digit number n. One of those six numbers is the least common multiple of all six of them. What is the sum of all possible values of n?

(A) 960 **(B)** 1680 **(C)** 2160 **(D)** 2280 **(E)** 2400

12. A drawer has 100 red socks and 100 blue socks. Pippi randomly removes one sock at a time, without replacement, until all the socks of one color have been removed. What is the probability that there are exactly 2 socks left in the drawer once that happens?

(A) $\frac{27}{196}$ **(B)** $\frac{49}{198}$ **(C)** $\frac{247}{990}$ **(D)** $\frac{50}{199}$ **(E)** $\frac{25}{99}$

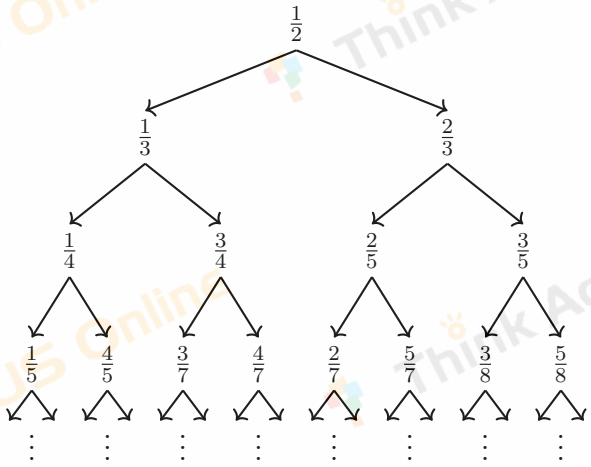
13. Two bicycle clubs, with disjoint memberships, go on a tour together. On the morning of the tour, members greet each other with a handshake. Everyone shakes hands with everyone else exactly once. There were 119 handshakes between members of the same club and 112 handshakes between members of different clubs. How many more people came from the larger club than from the smaller club?

(A) 0 **(B)** 4 **(C)** 6 **(D)** 7 **(E)** 8

14. Consider a triangle with positive area whose side lengths are functions of t given by $a = t^2 + 1$, $b = 5t + 7$, and $c = 4t + 4$. How many different integer values of t are possible?

(A) 0 **(B)** 7 **(C)** 9 **(D)** 10 **(E)** infinitely many

15. The tree diagram below has nodes labeled with rational numbers. The top node, at level 0, is $\frac{1}{2}$. Each node $\frac{a}{b}$ sprouts two nodes in the level below it, $\frac{a}{a+b}$ and $\frac{b}{a+b}$. For example, level 1 has nodes $\frac{1}{1+2} = \frac{1}{3}$ and $\frac{2}{1+2} = \frac{2}{3}$.



At what level does the node $\frac{20}{27}$ appear in the diagram?

(A) 5 **(B)** 8 **(C)** 12 **(D)** 26 **(E)** The node $\frac{20}{27}$ does not appear in the diagram.

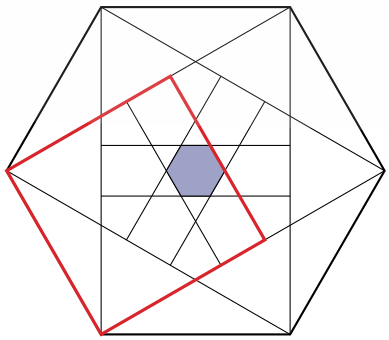
16. An urn contains 6 red balls, 4 black balls, and 4 white balls. Suppose 7 balls are drawn at random without replacement and a score is computed as follows:

- 1 point is given for each red ball up to a maximum of 3 points.
- 1 point is given for each black ball up to a maximum of 2 points.
- 1 point is given for each white ball up to a maximum of 2 points.

For example, drawing 1 red ball, 4 black balls, and 2 white balls would earn a score of $1 + 2 + 2 = 5$. What is the probability of getting the lowest possible score?

(A) $\frac{1}{858}$ **(B)** $\frac{5}{3432}$ **(C)** $\frac{1}{312}$ **(D)** $\frac{2}{429}$ **(E)** $\frac{5}{264}$

17. For each edge of a regular hexagon with side length 1, a square is constructed inside the hexagon with that edge as one of its sides. The region interior to all six squares is the interior of a smaller hexagon, shown shaded in the figure below.



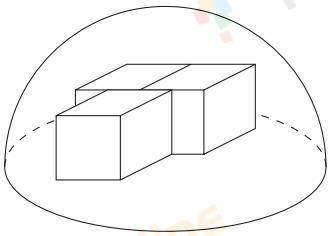
The area of the smaller hexagon can be expressed in the form $\frac{a\sqrt{b}}{c} - d$, where a, b, c, and d are positive integers, a and c are relatively prime, and b is not divisible by the square of any prime. What is $a+b+c+d$?

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

18. The strictly decreasing sequence of 11 positive integers $(a_0, a_1, a_2, \ldots, a_{10})$ is defined by the recursive rule $a_k = \frac{1}{2}a_{k-1} + 2$ for $k \geq 1$. Let N be the minimum possible value of a_0. What is the sum of the digits of N?

(A) 7 **(B)** 9 **(C)** 10 **(D)** 11 **(E)** 14

19. Three $2 \times 2 \times 2$ cubes sit on a table so that two of the cubes share a face, and a face of the third cube is centered along a shared edge of the other two cubes, as shown.



A hemispherical cover is placed over the cubes so that its circumference rests on the table and the cubes are under the cover. What is the least possible value of the radius of the cover?

(A) 3 **(B)** $\frac{\sqrt{357}}{6}$ **(C)** $\frac{\sqrt{681}}{8}$ **(D)** $\frac{\sqrt{178}}{4}$ **(E)** $2\sqrt{3}$

20. Boxes with dimensions $77 \times 78 \times 85$ or $2 \times 3 \times 85085$ have volume 510,510. How many different boxes with integer side lengths at least 2, including these two, have volume 510,510? Boxes are considered different if they have different dimensions.

(A) 63 **(B)** 90 **(C)** 301 **(D)** 377 **(E)** 966

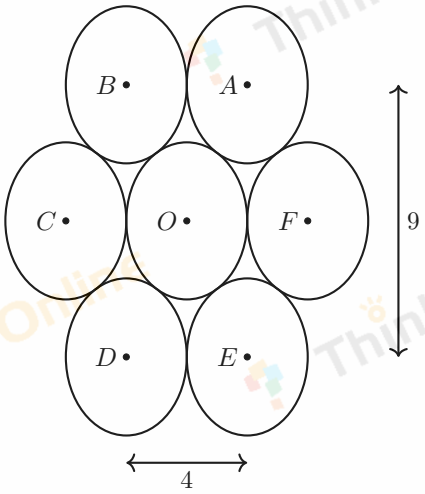
21. Gerry is playing the Triples Game. Her task is to partition the 3×3 grid of squares shown on the left into three sections, each containing three adjoining squares. (Three squares are adjoining if each shares an edge with at least one of the other two.) One point will be awarded for each section containing more X's than O's. Shown on the right is a sample partition that will earn one point in total. A partition that earns two or more points will win the game. What fraction of the possible partitions of this particular grid will result in a win for Gerry?

X	O	X
X	X	O
O	O	O

X	O	X
X	X	O
O	O	O

(A) $\frac{3}{10}$ **(B)** $\frac{1}{3}$ **(C)** $\frac{2}{5}$ **(D)** $\frac{4}{9}$ **(E)** $\frac{1}{2}$

22. An engineer is designing a closely packed field of 7 wind turbines for electricity production. Each turbine, whose center is marked by a labeled dot in the figure, occupies one of 7 congruent elliptical regions. Turbines in the same row have centers that are 4 units apart, and turbines in the same column have centers that are 9 units apart, as shown in the figure below.



The major axis of each ellipse is $m\sqrt{p}$, where m and p are positive integers and p is not divisible by the square of any prime. What is $m+p$?

(A) 6 **(B)** 8 **(C)** 9 **(D)** 10 **(E)** 12

23. In a list of one or more consecutive integers, there are p multiples of 2 and q multiples of 3. How many ordered pairs (p,q) are possible for this list if p and q are between 0 and 100, inclusive?

(A) 232 **(B)** 233 **(C)** 234 **(D)** 235 **(E)** 236

24. How many polynomials $f(x)$ of degree 3 satisfying

$$f\left(3+\sqrt{5}\right) = f\left(3-\sqrt{5}\right)$$

are there that have leading coefficient equal to 1 and all of whose coefficients are integers between -10 and 10, inclusive?

(A) 21 **(B)** 42 **(C)** 63 **(D)** 84 **(E)** 105

25. Chris the squirrel has 20 rooms in his cavern for storing food. The first room contains 1 nut, the second room contains 2 nuts, the third room contains 3 nuts, and so on, with the 20th room containing 20 nuts. Starting from today, Chris will collect 18 additional nuts each day and store them one per room in 18 distinct rooms in his cavern. His goal is to have all the rooms contain the same number of nuts once he is finished. What is the minimum number of days required to accomplish this goal?

(A) 75 **(B)** 95 **(C)** 105 **(D)** 190 **(E)** 195