
AMC 10

SET 15

HALF-LENGTH PRACTICE

TIME ALLOWED

30 : 00

10 QUESTIONS • 30 MINUTES • 60 POINTS • MIDDLE BAND (PROBLEMS 10--20)

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO BEGIN.

Name _____

Date _____

Start _____

Finish _____

All 10 problems come from positions 10–20 of past AMC 10 contests (2000–2019) and appear in their original wording, in order of their original position. Problems © Mathematical Association of America.

INSTRUCTIONS

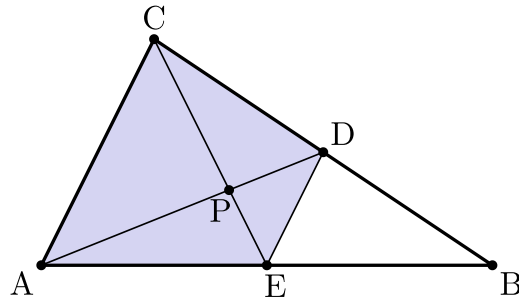
1. Do not open this booklet until you are told to begin.
2. This is a 10-question multiple-choice test. Every problem was originally problem 10 to 20 of an AMC 10 — the middle band of the paper, where scores are decided. They appear in order of their original position, so the difficulty rises from the first problem to the last.
3. Each question is followed by answers marked (A), (B), (C), (D) and (E). Only one of these is correct. Mark your answers on the answer sheet at the back of this booklet.
4. **Scoring:** 6 points for each correct answer, 1.5 points for each problem left unanswered, 0 points for each incorrect answer. A random guess is worth less, on average, than a blank.
5. Only scratch paper, graph paper, rulers, compasses, protractors and erasers are allowed. No calculators, smartwatches, phones or computing devices.
6. Figures are not necessarily drawn to scale.
7. You will have **30 minutes**. Note your start time on the cover and stop the moment the time is up.

Pacing guide

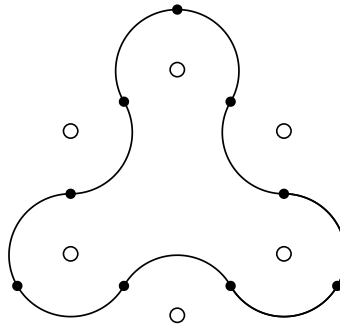
Three minutes per problem is the pace of the real test in this band: problems 1–5 in about 13 minutes, problems 6–10 in the remaining 17. If a problem has taken three minutes with no plan in sight, move on and come back.

1. How many rearrangements of $abcd$ are there in which no two adjacent letters are also adjacent letters in the alphabet? For example, no such rearrangements could include either ab or ba .
- (A) 0 (B) 1 (C) 2 (D) 3 (E) 4
2. One dimension of a cube is increased by 1, another is decreased by 1, and the third is left unchanged. The volume of the new rectangular solid is 5 less than that of the cube. What was the volume of the cube?
- (A) 8 (B) 27 (C) 64 (D) 125 (E) 216
3. 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
4. Two real numbers are selected independently at random from the interval $[-20, 10]$. What is the probability that the product of those numbers is greater than zero?
- (A) $\frac{1}{9}$ (B) $\frac{1}{3}$ (C) $\frac{4}{9}$ (D) $\frac{5}{9}$ (E) $\frac{2}{3}$
5. Mrs. Walter gave an exam in a mathematics class of five students. She entered the scores in random order into a spreadsheet, which recalculated the class average after each score was entered. Mrs. Walter noticed that after each score was entered, the average was always an integer. The scores (listed in ascending order) were 71, 76, 80, 82, and 91. What was the last score Mrs. Walter entered?
- (A) 71 (B) 76 (C) 80 (D) 82 (E) 91
6. When a bucket is two-thirds full of water, the bucket and water weigh a kilograms. When the bucket is one-half full of water the total weight is b kilograms. In terms of a and b , what is the total weight in kilograms when the bucket is full of water?
- (A) $\frac{2}{3}a + \frac{1}{3}b$ (B) $\frac{3}{2}a - \frac{1}{2}b$ (C) $\frac{3}{2}a + b$ (D) $\frac{3}{2}a + 2b$ (E) $3a - 2b$

7. In triangle $\triangle ABC$, medians AD and CE intersect at P , $PE = 1.5$, $PD = 2$, and $DE = 2.5$. What is the area of $AEDC$?



- (A) 13 (B) 13.5 (C) 14 (D) 14.5 (E) 15
8. Suppose that m and n are positive integers such that $75m = n^3$. What is the minimum possible value of $m + n$?
- (A) 15 (B) 30 (C) 50 (D) 60 (E) 5700
9. The closed curve in the figure is made up of 9 congruent circular arcs each of length $\frac{2\pi}{3}$, where each of the centers of the corresponding circles is among the vertices of a regular hexagon of side 2. What is the area enclosed by the curve?



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

- 10.** In the sequence 2001, 2002, 2003, $\dots$, each term after the third is found by subtracting the previous term from the sum of the two terms that precede that term. For example, the fourth term is $2001 + 2002 - 2003 = 2000$. What is the 2004th term in this sequence?

(A) -2004 (B) -2 (C) 0 (D) 4003 (E) 6007

END OF EXAMINATION

ANSWER SHEET

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Name _____

Date _____

1 ☐ A ☐ B ☐ C ☐ D ☐ E

2 ☐ A ☐ B ☐ C ☐ D ☐ E

3 ☐ A ☐ B ☐ C ☐ D ☐ E

4 ☐ A ☐ B ☐ C ☐ D ☐ E

5 ☐ A ☐ B ☐ C ☐ D ☐ E

6 ☐ A ☐ B ☐ C ☐ D ☐ E

7 ☐ A ☐ B ☐ C ☐ D ☐ E

8 ☐ A ☐ B ☐ C ☐ D ☐ E

9 ☐ A ☐ B ☐ C ☐ D ☐ E

10 ☐ A ☐ B ☐ C ☐ D ☐ E

Fill in one circle per question. Leave the row empty to skip.

Correct	Blank	Wrong	Score
×6	×1.5	×0	/ 60