
AMC 10

SET 12

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. A rectangular floor that is 10 feet wide and 17 feet long is tiled with 170 one-foot square tiles. A bug walks from one corner to the opposite corner in a straight line. Including the first and the last tile, how many tiles does the bug visit?

(A) 17 (B) 25 (C) 26 (D) 27 (E) 28

2. A shopper plans to purchase an item that has a listed price greater than \$100 and can use any one of the three coupons. Coupon A gives 15% off the listed price, Coupon B gives \$30 off the listed price, and Coupon C gives 25% off the amount by which the listed price exceeds \$100.

Let x and y be the smallest and largest prices, respectively, for which Coupon A saves at least as many dollars as Coupon B or C. What is $y - x$?

(A) 50 (B) 60 (C) 75 (D) 80 (E) 100

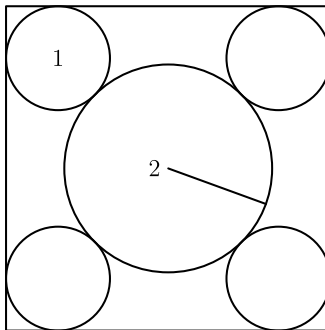
3. The largest divisor of 2,014,000,000 is itself. What is its fifth-largest divisor?

(A) 125,875,000 (B) 201,400,000 (C) 251,750,000
(D) 402,800,000 (E) 503,500,000

4. What value of x makes $8xy - 12y + 2x - 3 = 0$ true for all values of y ?

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

5. Four circles of radius 1 are each tangent to two sides of a square and externally tangent to a circle of radius 2, as shown. What is the area of the square?



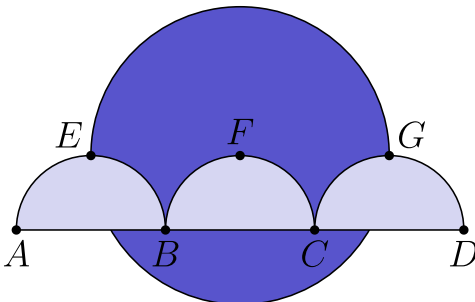
(A) 32 (B) $22 + 12\sqrt{2}$ (C) $16 + 16\sqrt{3}$ (D) 48 (E) $36 + 16\sqrt{2}$

6. A restaurant offers three desserts, and exactly twice as many appetizers as main courses. A dinner consists of an appetizer, a main course, and a dessert. What is the least number of main courses that the restaurant should offer so that a customer could have a different dinner each night in the year 2003?
- (A) 4 (B) 5 (C) 6 (D) 7 (E) 8
7. Brenda and Sally run in opposite directions on a circular track, starting at diametrically opposite points. They first meet after Brenda has run 100 meters. They next meet after Sally has run 150 meters past their first meeting point. Each girl runs at a constant speed. What is the length of the track in meters?
- (A) 250 (B) 300 (C) 350 (D) 400 (E) 500
8. A $3 \times 3 \times 3$ cube is formed by gluing together 27 standard cubical dice. (On a standard die, the sum of the numbers on any pair of opposite faces is 7.) The smallest possible sum of all the numbers showing on the surface of the $3 \times 3 \times 3$ cube is
- (A) 60 (B) 72 (C) 84 (D) 90 (E) 96
9. Joey and Chloe and their daughter Zoe all have the same birthday. Joey is 1 year older than Chloe, and Zoe is exactly 1 year old today. Today is the first of the 9 birthdays on which Chloe's age will be an integral multiple of Zoe's age. What will be the sum of the two digits of Joey's age the next time his age is a multiple of Zoe's age?
- (A) 7 (B) 8 (C) 9 (D) 10 (E) 11

10. As shown in the figure, line segment $\overline{AD}$ is trisected by points B and C so that $AB = BC = CD = 2$. Three semicircles of radius 1, $\widehat{AEB}$, $\widehat{BFC}$, and $\widehat{CGD}$, have their diameters on $\overline{AD}$, lie in the same halfplane determined by line AD , and are tangent to line EG at E , F , and G , respectively. A circle of radius 2 has its center at F . The area of the region inside the circle but outside the three semicircles, shaded in the figure, can be expressed in the form

$$\frac{a}{b} \cdot \pi - \sqrt{c} + d,$$

where a , b , c , and d are positive integers and a and b are relatively prime. What is $a + b + c + d$?



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

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