TRIANGLES AND THE PYTHAGOREAN THEOREM FOR AMC 8: PRACTICE SET

ANDY JO

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1. Problems

Beginner.

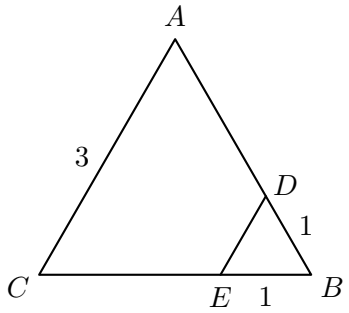
1. (1996 AJHSME, Problem #8) Points A and B are 10 units apart. Points B and C are 4 units apart. Points C and D are 3 units apart. If A and D are as close as possible, then the number of units between them is

(A) 0 **(B)** 3 **(C)** 9 **(D)** 11 **(E)** 17

2. (2017 AMC 10A, Problem #7) Jerry and Silvia wanted to go from the southwest corner of a square field to the northeast corner. Jerry walked due east and then due north to reach the goal, but Silvia headed northeast and reached the goal walking in a straight line. Which of the following is closest to how much shorter Silvia's trip was, compared to Jerry's trip?

(A) 30% **(B)** 40% **(C)** 50% **(D)** 60% **(E)** 70%

3. (1987 AHSME, Problem #2) As shown in the figure, a triangular corner with side lengths $DB = EB = 1$ is cut from equilateral triangle ABC of side length 3. The perimeter of the remaining quadrilateral $ADEC$ is



(A) 6 **(B)** $6\frac{1}{2}$ **(C)** 7 **(D)** $7\frac{1}{2}$ **(E)** 8

4. (2004 AMC 10B, Problem #8) Minneapolis-St. Paul International Airport is 8 miles southwest of downtown St. Paul and 10 miles southeast of downtown Minneapolis. Which of the following is closest to the number of miles between downtown St. Paul and downtown Minneapolis?

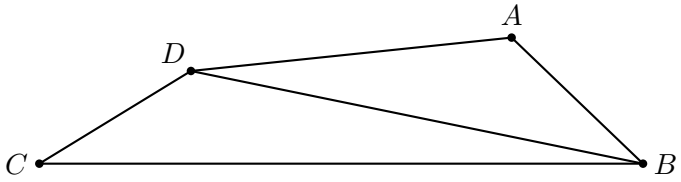
(A) 13 **(B)** 14 **(C)** 15 **(D)** 16 **(E)** 17

5. (2015 AMC 8, Problem #6) In $\triangle ABC$, $AB = BC = 29$, and $AC = 42$. What is the area of $\triangle ABC$?

(A) 100 **(B)** 420 **(C)** 500 **(D)** 609 **(E)** 701

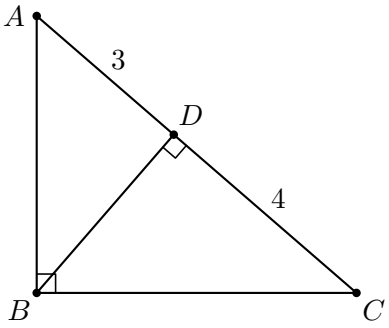
Intermediate.

6. (2009 AMC 10A, Problem #12) In quadrilateral $ABCD$, $AB = 5$, $BC = 17$, $CD = 5$, $DA = 9$, and BD is an integer. What is BD?



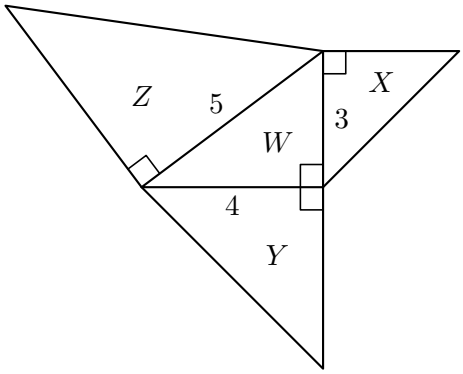
(A) 11 **(B)** 12 **(C)** 13 **(D)** 14 **(E)** 15

7. (2009 AMC 10A, Problem #10) Triangle ABC has a right angle at B. Point D is the foot of the altitude from B, $AD = 3$, and $DC = 4$. What is the area of $\triangle ABC$?



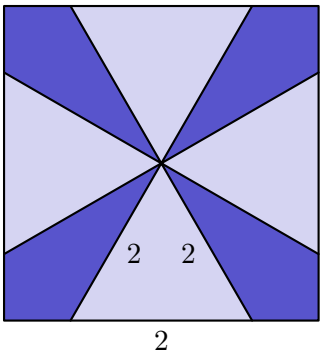
(A) $4\sqrt{3}$ **(B)** $7\sqrt{3}$ **(C)** 21 **(D)** $14\sqrt{3}$ **(E)** 42

8. (2002 AMC 8, Problem #16) Right isosceles triangles are constructed on the sides of a $3-4-5$ right triangle, as shown. A capital letter represents the area of each triangle. Which one of the following is true?



(A) $X + Z = W + Y$ **(B)** $W + X = Z$ **(C)** $3X + 4Y = 5Z$
(D) $X + W = \frac{1}{2}(Y + Z)$ **(E)** $X + Y = Z$

9. (2019 AMC 10B, Problem #8) The figure below shows a square and four equilateral triangles, with each triangle having a side lying on a side of the square, such that each triangle has side length 2 and the third vertices of the triangles meet at the center of the square. The region inside the square but outside the triangles is shaded. What is the area of the shaded region?



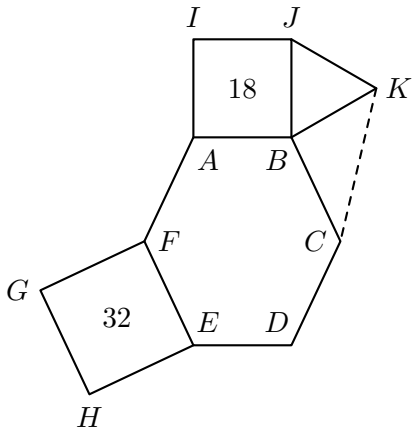
(A) 4 **(B)** $12 - 4\sqrt{3}$ **(C)** $3\sqrt{3}$ **(D)** $4\sqrt{3}$ **(E)** $16 - 4\sqrt{3}$

10. (2011 AMC 10B, Problem #14) A rectangular parking lot has a diagonal of 25 meters and an area of 168 square meters. In meters, what is the perimeter of the parking lot?

(A) 52 **(B)** 58 **(C)** 62 **(D)** 68 **(E)** 70

Advanced.

11. (2015 AMC 8, Problem #21) In the given figure hexagon $ABCDEF$ is equiangular, $ABJI$ and $FEHG$ are squares with areas 18 and 32 respectively, $\triangle JBK$ is equilateral and $FE = BC$. What is the area of $\triangle KBC$?



(A) $6\sqrt{2}$ **(B)** 9 **(C)** 12 **(D)** $9\sqrt{2}$ **(E)** 32

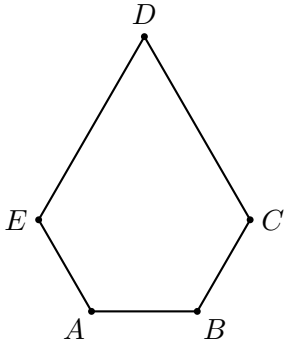
12. (2015 AMC 12B, Problem #10) How many noncongruent integer-sided triangles with positive area and perimeter less than 15 are neither equilateral, isosceles, nor right triangles?

(A) 3 **(B)** 4 **(C)** 5 **(D)** 6 **(E)** 7

13. (2022 AMC 10A, Problem #5) Square $ABCD$ has side length 1. Points P, Q, R, and S each lie on a side of $ABCD$ such that $APQCRS$ is an equilateral convex hexagon with side length s. What is s?

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

14. (1993 AHSME, Problem #14) The convex pentagon $ABCDE$ has $\angle A = \angle B = 120^\circ$, $EA = AB = BC = 2$ and $CD = DE = 4$. What is the area of $ABCDE$?



(A) 10 **(B)** $7\sqrt{3}$ **(C)** 15 **(D)** $9\sqrt{3}$ **(E)** $12\sqrt{5}$

15. (1980 AHSME, Problem #9) A man walks x miles due west, turns 150° to his left and walks 3 miles in the new direction. If he finishes at a point $\sqrt{3}$ miles from his starting point, then x is

(A) $\sqrt{3}$ **(B)** $2\sqrt{3}$ **(C)** $\frac{3}{2}$ **(D)** 3 **(E)** not uniquely determined by the given information

2. Answer Key

Problem	Letter	Value
1	B	3
2	A	30%
3	E	8
4	A	13
5	B	420
6	C	13
7	B	$7\sqrt{3}$
8	E	$X + Y = Z$
9	B	$12 - 4\sqrt{3}$
10	C	62
11	C	12
12	C	5
13	C	$2 - \sqrt{2}$
14	B	$7\sqrt{3}$
15	E	not uniquely determined by the given information