ANGLES, PARALLEL LINES, AND POLYGONS FOR AMC 8: PRACTICE SET

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1. Problems

Beginner.

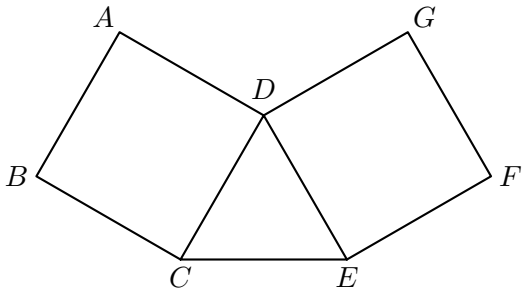
1. (1950 AHSME, Problem #12) As the number of sides of a polygon increases from 3 to n, the sum of the exterior angles formed by extending each side in succession:

(A) Increases **(B)** Decreases **(C)** Remains constant **(D)** Cannot be predicted **(E)** Becomes $(n-3)$ straight angles

2. (1991 AHSME, Problem #4) Which of the following triangles cannot exist?

(A) An acute isosceles triangle **(B)** An isosceles right triangle
(C) An obtuse right triangle **(D)** A scalene right triangle
(E) A scalene obtuse triangle

3. (1980 AHSME, Problem #4) In the adjoining figure, CDE is an equilateral triangle and $ABCD$ and $DEFG$ are squares. The measure of $\angle GDA$ is



(A) 90° **(B)** 105° **(C)** 120° **(D)** 135° **(E)** 150°

4. Two lines intersect, forming four angles. One of these four angles is 4 times as large as another one of them. What is the degree measure of the smallest of the four angles?

(A) 18 **(B)** 30 **(C)** 36 **(D)** 45 **(E)** 72

5. (1988 AHSME, Problem #6) A figure is an equiangular parallelogram if and only if it is a

(A) rectangle **(B)** regular polygon **(C)** rhombus **(D)** square
(E) trapezoid

Intermediate.

6. (1994 AHSME, Problem #9) If $\angle A$ is four times $\angle B$, and the complement of $\angle B$ is four times the complement of $\angle A$, then $\angle B =$

(A) 10° **(B)** 12° **(C)** 15° **(D)** 18° **(E)** 22.5°

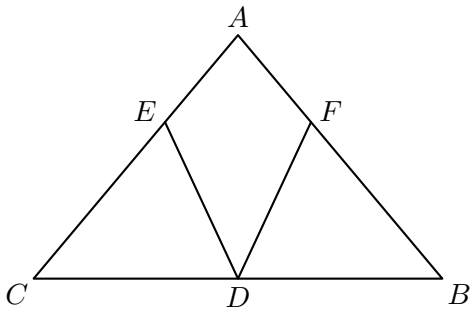
7. (1973 AHSME, Problem #16) If the sum of all the angles except one of a convex polygon is 2190°, then the number of sides of the polygon must be

(A) 13 **(B)** 15 **(C)** 17 **(D)** 19 **(E)** 21

8. (1976 AHSME, Problem #14) The measures of the interior angles of a convex polygon are in arithmetic progression. If the smallest angle is 100° and the largest angle is 140°, then the number of sides the polygon has is

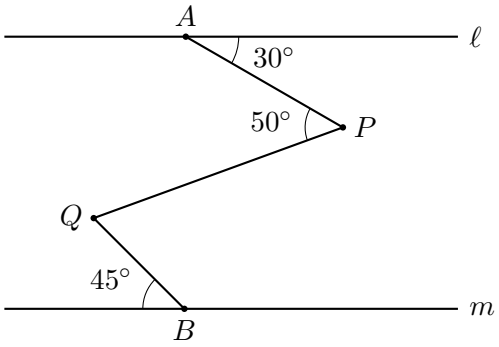
(A) 6 **(B)** 8 **(C)** 10 **(D)** 11 **(E)** 12

9. (1977 AHSME, Problem #4) In triangle ABC, $AB = AC$ and $\angle A = 80°$. If points D, E and F lie on sides BC, AC and AB, respectively, and $CE = CD$ and $BF = BD$, then $\angle EDF$ equals



(A) 30° **(B)** 40° **(C)** 50° **(D)** 65° **(E)** none of these

10. In the figure, lines ℓ and m are parallel, point A lies on ℓ, point B lies on m, and points P and Q lie between the two lines. What is the degree measure of $\angle PQB$?



(A) 55 **(B)** 65 **(C)** 75 **(D)** 80 **(E)** 95

Advanced.

11. (2003 AMC 8, Problem #20) What is the measure of the acute angle formed by the hands of a clock at 4:20 a.m.?

(A) 0° **(B)** 5° **(C)** 8° **(D)** 10° **(E)** 12°

12. (2016 AMC 8, Problem #23) Two congruent circles centered at points A and B each pass through the other circle's center. The line containing both A and B is extended to intersect the circles at points C and D.
The circles intersect at two points, one of which is E. What is the degree measure of $\angle CED$?

(A) 90 **(B)** 105 **(C)** 120 **(D)** 135 **(E)** 150

13. (1978 AHSME, Problem #12) In $\triangle ADE$, $\angle ADE = 140°$, points B and C lie on sides AD and AE, respectively, and points A, B, C, D, E are distinct. If lengths AB, BC, CD, and DE are all equal, then the measure of $\angle EAD$ is

(A) 5° **(B)** 6° **(C)** 7.5° **(D)** 8° **(E)** 10°

14. (2012 AMC 10A, Problem #10) Mary divides a circle into 12 sectors. The central angles of these sectors, measured in degrees, are all integers and they form an arithmetic sequence. What is the degree measure of the smallest possible sector angle?

(A) 5 **(B)** 6 **(C)** 8 **(D)** 10 **(E)** 12

15. (1962 AHSME, Problem #31) The ratio of the interior angles of two regular polygons with sides of unit length is $3 : 2$. How many such pairs are there?

(A) 1 **(B)** 2 **(C)** 3 **(D)** 4 **(E)** infinitely many

2. Answer Key

Problem	Letter	Value
1	C	Remains constant
2	C	An obtuse right triangle
3	C	120°
4	C	36
5	A	rectangle
6	D	18°
7	B	15
8	A	6
9	C	50°
10	B	65
11	D	10°
12	C	120
13	E	10°
14	C	8
15	C	3