1. In the eight-term sequence A, B, C, D, E, F, G, H, the value of C is 5 and the sum of any three consecutive terms is 30. What is A + H?

2. Let R be a set of nine distinct integers. Six of the elements are 2, 3, 4, 6, 9, and 14. What is the number of possible values of the median of R?

3. Set A consists of m consecutive integers whose sum is 2m, and set B consists of 2m consecutive integers whose sum is m. The absolute value of the difference between the greatest element of A and the greatest element of B is 99. Find m.

4. What is the area of the region bounded by the graphs of y = |x+2| - |x-2|and y = |x+1| - |x-3|?

5. A dart board is a regular octagon divided into regions as shown. Suppose that a dart thrown at the board is equally likely to land anywhere on the board. What is probability that the dart lands within the center square? Express your answer as a common fraction in simplest radical form.



6. How many positive integers less than 10,000 have at most two different digits?

7. How many different 4×4 arrays whose entries are all 1's and -1's have the property that the sum of the entries in each row is 0 and the sum of the entires in each column is 0?

8. In triangle ABC, we have AB = AC = 20 and BC = 14. Consider points M on \overline{AB} and N on \overline{AC} . If the minimum value of the sum BN + MN + MC is x, compute 100x.

9. In the diagram below, how many different routes are there from point M to

point P using only the line segments shown? A route is not allowed to intersect itself, not even at a single point.



10. Three mutually tangent spheres of radius 1 rest on a horizontal plane. A sphere of radius 2 rests on them. What is the distance from the plane to the top of the larger sphere? Express your answer as a common fraction in simplest radical form.