



Sponsored by: UGA Math Department, UGA Math Club,
UGA Parents and Families Association

CIPHERING ROUND / 1 OR 2 MINUTES PER PROBLEM

WITH SOLUTIONS

Problem 1. Find

$$1 + 2 + 4 + 8 + 16 + \cdots + 1024$$

Answer. 2047

Problem 2. Find

$$1 - 2 + 3 - 4 + 5 - 6 + \cdots + 2003$$

Answer. 1002

Problem 3. A man can cut a long cylindrical log into 4 cylindrical pieces in 5 minutes. Into how many such pieces can he cut it in 10 minutes?

Answer. 7

Problem 4. Find the radius of the circle whose equation is

$$x^2 - 2x + y^2 + 4y = 20.$$

Answer. 5

Problem 5. Alice, Bob, Charlie and Diane stand in a line in a random order. What is the probability that Alice and Bob are standing next to each other?

Answer.

$$\frac{1}{2}$$

Problem 6. Both of Ted's Algebra II classes took the same test. With 20 students in the first class, the average score was 80%. With 30 students in the second class, the average score was 70%. The average score of all his students was

Answer. 74%

Problem 7. Express the following with as few logarithms as possible:
 $(\log_8 27)(\log_9 64) =$

Answer. 3

Problem 8. Find

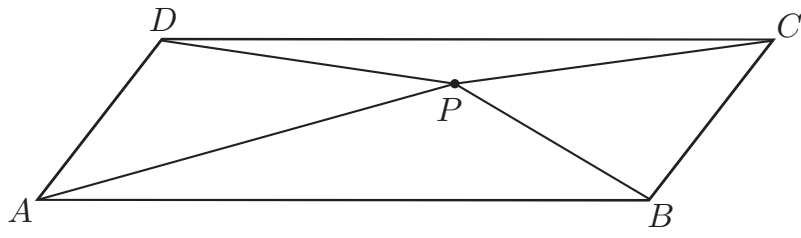
$$\sin^2 10^\circ + \sin^2 20^\circ + \sin^2 30^\circ + \cdots + \sin^2 90^\circ$$

Answer. 5

Problem 9. Leslie drives 50 mph to a city 60 miles away. At what rate must she drive on the return trip so as to average 60 mph for the round trip?

Answer. 75 mph

Problem 10. A point P is chosen inside parallelogram $ABCD$. If $\triangle PAB$ has area 10, $\triangle PBC$ has area 8 and $\triangle PCD$ has area 7, then what is the area of $\triangle PDA$?



Answer. 9