



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

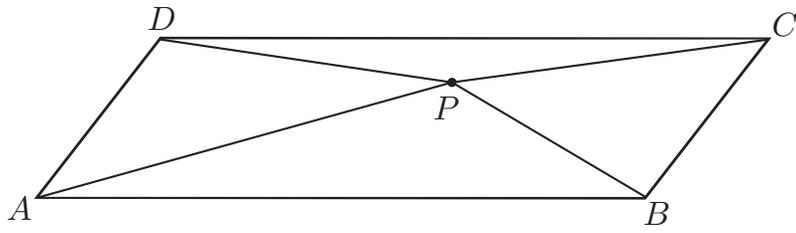
$$\sin^2 10^\circ + \sin^2 20^\circ + \sin^2 30^\circ + \cdots + \sin^2 90^\circ$$

**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