

PROBLEMS OF THE MONTH

MARCH/APRIL 2012

SUM OF PERMUTATIONS

By permuting the digits 4, 5, 6, 7, and 8, we can form 120 five-digit numbers. What is the sum of all such numbers?

CONTINUOUS FUNCTIONS

Find a family of real-valued continuous functions defined on $(-\infty, \infty)$ such that

$$f(x+y) = f(x) + f(y) + f(x)f(y).$$

SOLVE THE EQUATION

Find all real solutions of the following:

$$\frac{\sqrt{x}}{\sqrt[3]{x}} - \frac{\sqrt[3]{x}}{\sqrt[4]{x}} = 2.$$

FINDING DISTANCE WITH LIMITED DATA

Two motor boats on opposite shores a river start moving toward each other but at different speeds. (Neglect other factors, such as acceleration, turn-around time and current.) When they pass each other the first time, they are 700 yards from one shoreline. They continue to the opposite shore, then turn around and start moving toward each other again. When they pass the second time they are 300 yards from the other shoreline. Their speeds although different remain constant. How wide is the river?

You may submit solutions to all or some of these problems. The winner(s) will be chosen based on the number of problems solved and on clarity of mathematical writing. For other contest rules and prize information see the Problem of the Month display on the first floor of LeConte College. Contact Dr. Kaczkowski (kaczks@math.sc.edu) or Brett Barwick (barwicz@mailbox.sc.edu) for more details.

Solutions due in LC 411 by noon on April 17th.