

# THE CONTEST CORNER

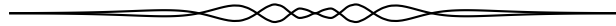
No. 47

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*The problems featured in this section have appeared in, or have been inspired by, a mathematics contest question at either the high school or the undergraduate level. Readers are invited to submit solutions, comments and generalizations to any problem. Please see submission guidelines inside the back cover or online.*

*To facilitate their consideration, solutions should be received by **April 1, 2017**.*

*The editor thanks André Ladouceur, Ottawa, ON, for translations of the problems.*



**CC231.** If  $x^2 + y^2 = 6xy$  with  $y > x > 0$ , find  $\frac{x+y}{x-y}$ .

**CC232.** Seven tests are given and on each test no ties are possible. Each person who is the top scorer on at least one of the tests or who is in the top six on at least four of these tests is given an award, but each person can receive at most one award. Find the maximum number of people who could be given awards if 100 students take these tests.

**CC233.** Let  $P$  be a point in the interior of the rectangle  $ABCD$ . Suppose that  $PA = a$ ,  $PB = b$  and  $PC = c$ , find, in terms of  $a, b, c$ , the length of the line segment  $PD$ .

**CC234.** Find  $B$  if

$$\frac{\log_{10} 16/3}{\log_{10} B}$$

is the solution to the exponential equation

$$2^{2x+4} + 3^{3x+2} = 4^{x+3}.$$

**CC235.** Find the area of a regular octagon formed by cutting equal isosceles triangles from the corners of a square with sides of one unit.



**CC231.** Soit  $x^2 + y^2 = 6xy$  où  $y > x > 0$ . Déterminer  $\frac{x+y}{x-y}$ .

**CC232.** Sept tests sont donnés à 100 élèves et il n'y a pas deux notes égales dans les résultats d'un même test. Chaque personne qui reçoit la plus haute note

dans au moins un test ou qui reçoit une des six meilleures notes dans au moins quatre tests recevra un prix, mais chaque personne ne peut recevoir plus d'un prix. Déterminer le nombre maximum de personnes qui pourraient recevoir un prix.

**CC233.** Soit  $P$  un point à l'intérieur du rectangle  $ABCD$  et soit  $PA = a$ ,  $PB = b$  et  $PC = c$ . Déterminer la longueur du segment  $PD$  en fonction de  $a$ ,  $b$  et  $c$ .

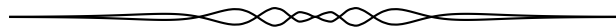
**CC234.** Déterminer la valeur de  $B$ , sachant que l'équation exponentielle

$$2^{2x+4} + 3^{3x+2} = 4^{x+3}$$

a pour solution

$$\frac{\log_{10} 16/3}{\log_{10} B}.$$

**CC235.** Déterminer l'aire d'un octogone régulier formé en découpant un triangle isocèle de chaque coin d'un carré dont les côtés ont une longueur de 1.



## Math Quotes

Another advantage of a mathematical statement is that it is so definite that it might be definitely wrong; and if it is found to be wrong, there is a plenteous choice of amendments ready in the mathematicians' stock of formulae. Some verbal statements have not this merit; they are so vague that they could hardly be wrong, and are correspondingly useless.

*Lewis Fry Richardson in "Mathematics of War and Foreign Politics."*