The CENTRE for EDUCATION in MATHEMATICS and COMPUTING

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From the archives of the CEMC

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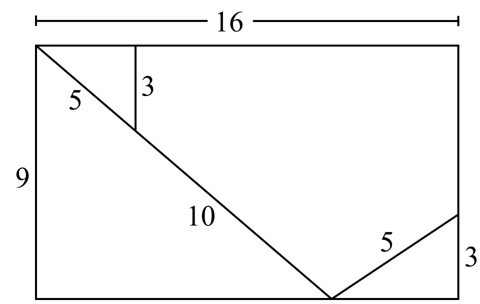
In honour of the 50th anniversary of the Faculty of Mathematics, at the beginning of each month of 2017, a set of five problems from the 54 years of CEMC contests will be posted. Solutions to the problems will be posted at the beginning of the next month. Hopefully, these problems will intrigue and inspire your mathematical mind. For more problem solving resources, please visit `cemc.uwaterloo.ca`.

1. *1963 Junior Mathematics Contest, Question 13*
   When the 16 by 9 rectangle in the diagram is cut in the manner shown, the pieces can form a square of perimeter:

   (A) 50 **(B)** 48 **(C)** 32
   (D) 40 **(E)** 36



2. *1974 Gauss Contest, Question 17*
   Nine coins have a value of \$1.35. If the coins are quarters and dimes, the number of dimes is

   (A) 2 **(B)** 5 **(C)** 7 **(D)** 1 **(E)** 6

3. *1980 Euclid Contest, Question A10*
   If n is the number of digits in 2^{3217}, then

   (A) $900 \leq n \leq 950$ **(B)** $965 \leq n \leq 990$ **(C)** $1000 \leq n \leq 1050$
   (D) $1070 \leq n \leq 1075$ **(E)** $n > 1075$

4. *1970 Ontario Senior Mathematics Problems Competition, Question 8*
   Prove that the equation $6x^2 + 2y^2 = z^2$ has no solution in integers x, y, z, except for $x = y = z = 0$.

5. *1982 Pascal Contest, Question 8*
   A pole is painted in white, green, and blue sections. If one-third of the pole is white and one-quarter of the pole is green, then the fraction of the pole that is blue is

   (A) $\frac{6}{7}$ **(B)** $\frac{11}{12}$ **(C)** $\frac{7}{12}$ **(D)** $\frac{5}{12}$ **(E)** $\frac{5}{7}$