The CENTRE for EDUCATION in MATHEMATICS and COMPUTING

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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. *1975 Junior Mathematics Contest, Question 23*
   In a semi-circle, AB and CD are parallel chords of lengths 24 and 10 respectively. The distance between these chords is 7. The radius of the semi-circle is

   (A) 12 **(B)** 15 **(C)** 14 **(D)** 17 **(E)** 13

2. *1966 Junior Mathematics Contest, Question 27*
   A man has walked two-thirds of the distance across a railroad bridge when he observes a train approaching at 45 kilometers per hour. If he can just manage to escape by running at the same uniform speed to either end of the bridge, what is this rate of speed?

3. *1984 Fermat Contest, Question 19*
   If $100^{25} - 25$ is expressed as an integer, the sum of its digits is

   (A) 219 **(B)** 444 **(C)** 432 **(D)** 453 **(E)** 435

4. *1967 Junior Mathematics Contest, Question 23*
   Two parallel lines intersect the x-axis cutting off a line segment of length 3. The same lines also cut off a segment of the y-axis of length 4. The perpendicular distance between the lines is

   (A) 5 **(B)** 2.5 **(C)** $\frac{7}{3}$ **(D)** $\frac{5}{12}$ **(E)** none of these

5. *1983 Cayley Contest, Question 15*
   In a competition, the average score of Pat's first 4 games was 6.5; the average of her next 5 games was 6.4. If she scored 9 on her tenth game, her overall average was

   (A) 10.95 **(B)** 7.725 **(C)** 7.3 **(D)** 6.96 **(E)** 6.7