



# Canadian Mathematics Competition

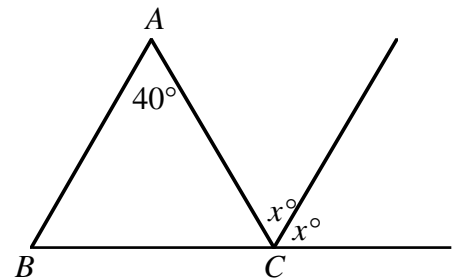
An activity of The Centre for Education  
in Mathematics and Computing,  
University of Waterloo, Waterloo, Ontario

## *Pascal Contest* (Grade 9)

Wednesday, February 19, 1997

**Part A: Each question is worth 5 credits.**

1.  $\frac{4+35}{8-5}$  equals  
 (A)  $\frac{11}{7}$                       (B) 8                      (C)  $\frac{7}{2}$                       (D) -12                      (E) 13
2. In the subtraction question  $\begin{array}{r} 4 \heartsuit 7 \\ 1\ 8\ 9 \\ - 2\ 6\ 8 \end{array}$ , the  $\heartsuit$  represents the digit  
 (A) 2                      (B) 8                      (C) 7                      (D) 5                      (E) 4
3. The value of  $2\frac{1}{10} + 3\frac{11}{100} + 4\frac{111}{1000}$  is  
 (A) 9.321                      (B) 9.111                      (C) 9.123                      (D) 9.111111                      (E) 9.11081081
4.  $(1)^{10} + (-1)^8 + (-1)^7 + (1)^5$  equals  
 (A) 0                      (B) 1                      (C) 2                      (D) 16                      (E) 4
5. If 60% of a number is 42, what is 50% of the same number?  
 (A) 25                      (B) 28                      (C) 30                      (D) 35                      (E) 40
6. If  $x = -2$ , the value of  $(x)(x^2)\left(\frac{1}{x}\right)$  is  
 (A) 4                      (B)  $-8\frac{1}{2}$                       (C) -4                      (D) -8                      (E) 16
7. In the diagram the triangle shown is isosceles with  $AB = AC$ . The value of  $x$  is  
 (A) 40                      (B) 55                      (C) 35  
 (D) 50                      (E) 35

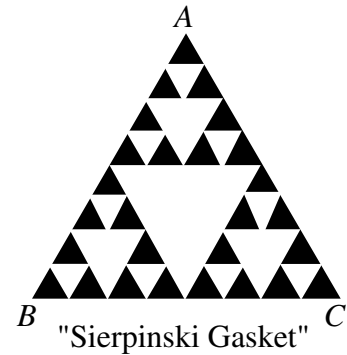


8. The greatest number of Mondays that can occur in the first 45 days of a year is  
 (A) 5                      (B) 6                      (C) 7                      (D) 8                      (E) 9
9. When a certain number is divided by 9, the quotient is 6 and the remainder is 4. The number is  
 (A) 58                      (B) 42                      (C) 33                      (D) 67                      (E) 49
10. The sum of nine consecutive positive integers is 99. The largest of these integers is  
 (A) 9                      (B) 11                      (C) 19                      (D) 7                      (E) 15



16. In the diagram, all triangles are equilateral. What fraction of  $\triangle ABC$  is coloured black?

(A)  $\frac{3}{4}$                       (B)  $\frac{1}{2}$                       (C)  $\frac{9}{16}$   
 (D)  $\frac{4}{9}$                       (E)  $\frac{27}{64}$



17. The digits 1, 2, 3, 4 can be arranged to form twenty-four different four-digit numbers. If these twenty-four numbers are then listed from the smallest to largest, in what position is 3142?

(A) 13th                      (B) 14th                      (C) 15th                      (D) 16th                      (E) 17th

18. The product of  $20^{50}$  and  $50^{20}$  is written as an integer in expanded form. The number of zeros at the end of the resulting integer is

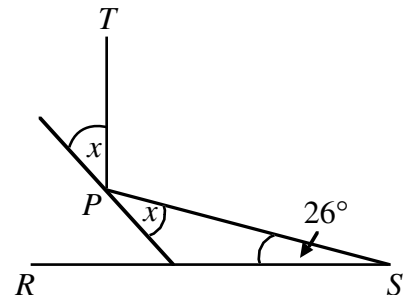
(A) 70                      (B) 71                      (C) 90                      (D) 140                      (E) 210

19. Three balls numbered 1, 2, and 3 are placed in a bag. A ball is drawn from the bag and the number is recorded. The ball is returned to the bag. After this has been done three times, what is the probability that the sum of the three recorded numbers is less than 8?

(A)  $\frac{23}{27}$                       (B)  $\frac{5}{7}$                       (C)  $\frac{5}{9}$                       (D)  $\frac{8}{9}$                       (E)  $\frac{22}{27}$

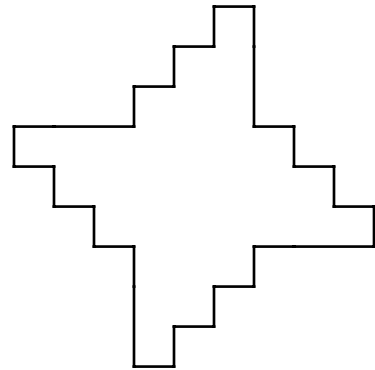
20. A beam of light shines from point  $S$ , reflects off a reflector at point  $P$ , and reaches point  $T$  so that  $PT$  is perpendicular to  $RS$ . Then  $x$  is

(A)  $26^\circ$                       (B)  $32^\circ$                       (C)  $37^\circ$   
 (D)  $38^\circ$                       (E)  $45^\circ$



**Part C: Each question is worth 8 credits.**

21. In the diagram adjacent edges are at right angles. The four longer edges are equal in length, and all of the shorter edges are also equal in length. The area of the shape is 528. What is the perimeter?  
 (A) 132                      (B) 264                      (C) 144  
 (D) 72                        (E) 92



22. If  $\frac{97}{19} = w + \frac{1}{x + \frac{1}{y}}$ , where  $w, x, y$  are all positive integers, then  $w + x + y$  equals  
 (A) 16                      (B) 17                      (C) 18                      (D) 19                      (E) 26
23. Determine all ordered pairs that satisfy  $(x - y)^2 + x^2 = 25$ , where  $x$  and  $y$  are integers and  $x \geq 0$ . The number of different values of  $y$  that occur is  
 (A) 3                      (B) 4                      (C) 5                      (D) 6                      (E) 7
24. Two ships, one 200 metres in length and the other 100 metres in length, travel at constant but different speeds. When travelling in opposite directions, it takes 10 seconds for them to completely pass each other. When travelling in the same direction, it takes 25 seconds for them to completely pass each other. The speed of the faster ship, in metres per second, is  
 (A) 12                      (B) 14                      (C) 18                      (D) 21                      (E) 30

25. In the diagram, the right prism has quadrilateral base  $EFGH$  with right angles at  $E$  and  $G$ . The height  $AE$  is 32. The distance from  $A$  to  $G$  is  
 (A) 41                      (B) 40                      (C) 34  
 (D) 36                      (E) 44

