



Intermediate Math Circles

February 04, 2015

Contest Preparation I

WARM-UP: Hockey is Back!

Four teams A, B, C, and D competed against each other. Unlike the NHL, games in this league can end in a tie. The following table summarizes the results of the games:

Team	Wins	Ties	Losses	Goals For	Goals Against
A	3	0	0	5	1
B	1	1	1	2	2
C	0	2	1	5	6
D	0	1	2	3	6

In the final game, B played C and the score was 1-1.

- Which team won in each of the six matches?
- What were the scores in the matches that B played?
- What were the scores in the rest of the matches?



General Contest Information

- Name of the contest you would write _____
- Date of Contest _____
- Registration Deadline _____
- Contest Details

- The key to Success _____
- Available resources to help you prepare

Go to http://www.cemc.uwaterloo.ca/contests/pcf_eWorkshop.html for the Pascal, Cayley, Fermat E-workshop.

CEMC Home	Mathematics and Computing Contests
Mathematics and Computing Contests	Pascal, Cayley and Fermat eWorkshop
Registration	The Pascal, Cayley and Fermat eWorkshop consists of 4 quizzes designed to help students prepare for the Pascal, Cayley and Fermat contests.
Preparation	
Results	Each quiz consists of 10 questions and is designed to be completed in 20 to 30 minutes. The topics and difficulty levels are designed to be a tool for interested students to prepare for these contests. The problems on each quiz generally progress from easier to harder.
Past Contests	Answers and hints for all quizzes within a given set are also provided.
Committees	
Master of Mathematics for Teachers	
Web Resources	
Face-to-Face Workshops	
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Set 1	Pascal	Cayley	Fermat	Answers
Set 2	Pascal	Cayley	Fermat	Answers
Set 3	Pascal	Cayley	Fermat	Answers
Set 4	Pascal	Cayley	Fermat	Answers

Go to http://www.cemc.uwaterloo.ca/contests/past_contests.html for old contests and solutions available for over 15 years.

Pascal (Grade 9)											North and South America PDF
	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	
Contests	2001	2000	1999	1998	1997						North America PDF
	Download all as single PDF										
Solutions	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	
	2001	2000	1999	1998	1997						
Results	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	
	2001										
Cayley (Grade 10)											
Contests	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	
	2001	2000	1999	1998	1997						
	Download all as single PDF										
Solutions	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	
	2001	2000	1999	1998	1997						
Results	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	
	2001										
Fermat (Grade 11)											
Contests	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	
	2001	2000	1999	1998	1997						
	Download all as single PDF										
Solutions	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	
	2001	2000	1999	1998	1997						

Math Circles for contest preparation sessions / workshops.



Eliminating Answers

From PCF EWorkshop Practice Cayley #2 Question 1

If $x = -2$ and $y = -5$ then $(x - y)(x + y)$ equals

- (A) 40 (B) 21 (C) 0 (D) -21 (E) -49

(Pascal #3)

If $a = 4$, $b = 5$, and $c = 9$, then the value of $(a + b - c) + (a - b + c)$ is

- (A) 8 (B) 0 (C) -10 (D) 10 (E) 16

(Pascal #4)

The number of odd integers between $\frac{19}{4}$ and $\frac{43}{2}$ is

- (A) 8 (B) 9 (C) 10 (D) 16 (E) 17

(Pascal #6)

The ratio of the number of red marbles to the number of green marbles in a container is 1 : 3.

If there are 48 marbles altogether, then the number of green marbles is

- (A) 12 (B) 16 (C) 36 (D) 32 (E) 24



(Pascal #5)

In a magic square, the sum of the entries in each row, in each column, and in each diagonal are all equal.

15	1	11
	9	N
	17	

In the magic square shown, the value of N is

- (A) 5 (B) 13 (C) 7 (D) 16 (E) 3

(Pascal #19)

During a high school drama rehearsal, 15 girls left. Twice as many boys as girls remained. Later, 45 boys departed, leaving five times as many girls as boys. Before anyone left the rehearsal, there were

- (A) 10 more girls than boys (B) 20 more boys than girls
(C) 25 more boys than girls (D) 10 more boys than girls
(E) 20 more girls than boys

(Pascal #16)

The number of integers between 2 and 50 that can be written in the form x^y , where x and y are positive integers and $y \neq 1$, is

- (A) 8 (B) 7 (C) 10 (D) 6 (E) 9



(Pascal #14)

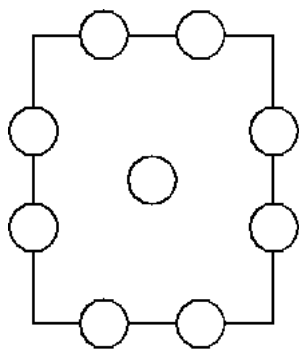
The eight digits 6, 5, 5, 4, 4, 3, 2, 1 are used to form two three-digit numbers and one two-digit number. The largest possible sum of these numbers is

- (A) 1119 (B) 1713 (C) 1218 (D) 30 (E) 1236

(Pascal #18)

Each of the numbers from 1 to 9 is placed, one per circle, into the pattern shown. The sums along each of the four sides are equal. The number of possible entries for the middle circle is

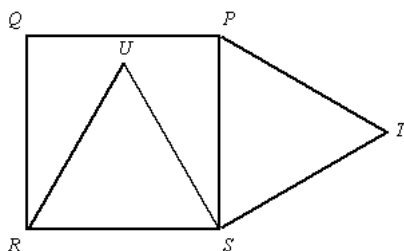
- (A) 2 (B) 9 (C) 1 (D) 5 (E) 3



(Pascal #7)

The diagram shows a square $PQRS$ and two equilateral triangles RSU and PST . PQ has length 1. The length of TU is

- (A) $\sqrt{2}$ (B) $\frac{\sqrt{3}}{2}$ (C) $\sqrt{3}$ (D) $\sqrt{5} - 1$ (E) $\sqrt{6} - 1$





(Pascal #21)

In the “Big 15” Lottery, each of the numbers from 1000 to 9999 inclusive is printed, one to a ticket. A number is considered a winner if its hundreds digit is 8, its tens digit is 6, and it is divisible by 15. The number of winning tickets is

- (A) 3 (B) 9 (C) 2 (D) 15 (E) 6

(Pascal #23)

In the sequence 6, 14, 8, -6 , \dots , every term after the second is the difference of the preceding two terms in reverse order. For example, $8 = 14 - 6$ and $-6 = 8 - 14$. The sum of the first 2000 terms of the sequence is

- (A) 28 (B) 8 (C) 22 (D) 0 (E) 20

(Pascal #24)

On planet Binad, a Bank Cash mashine uses eight ON-OFF switches numbered 1 to 8 to allow deposits to and withdrawals from an account. All the switches start out OFF. When switch n is flipped ON, the balance of the account changes by $(-2)^n$ dollars. For example, if switches 4 and 7 are flipped ON and the other switches are left OFF, a withdrawal of 112 dollars is made. The number of switches that must be turned ON to deposit 114 dollars is

- (A) 4 (B) 6 (C) 5 (D) 3 (E) 7