Intermediate Math Circles
February 07, 2018
Contest Preparation I

WARM-UP: Hockey!

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.

a) Which team won in each of the six matches?

b) What were the scores in the matches that B played?

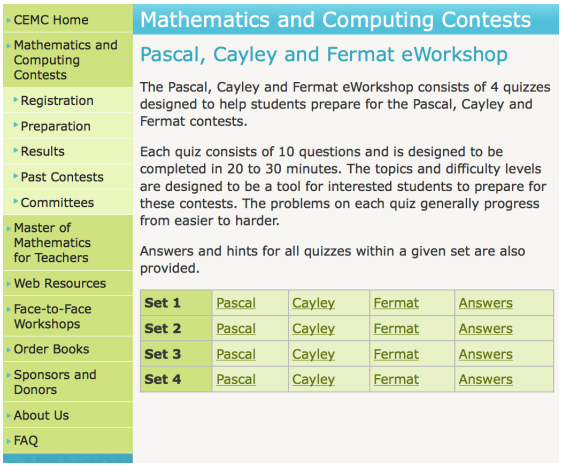
c) What were the scores in the rest of the matches?

General Contest Information

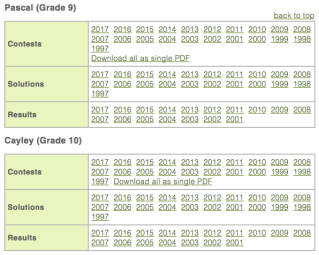
- Name of the contest you would write _____
- Date of Contest _____
- Registration Deadline _____
- Contest Details

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

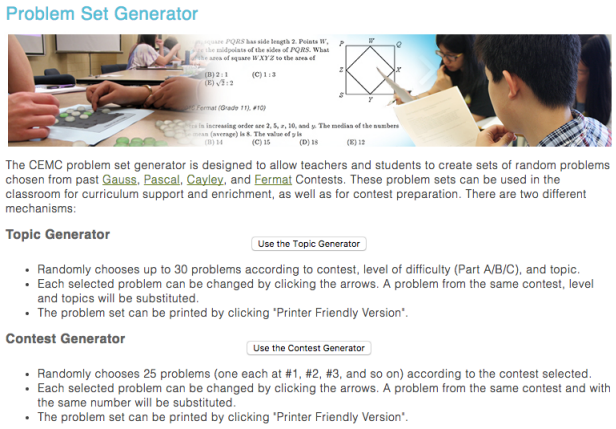
  Go to `http://www.cemc.uwaterloo.ca/contests/pcf_eWorkshop.html` for the Pascal, Cayley, Fermat E-workshop.



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



Go to `http://cemc2.math.uwaterloo.ca/contest/PSG/school/index.php` for old contest questions that can be generated by topic or to get a random contest.



Problem Set Generator

The CEMC problem set generator is designed to allow teachers and students to create sets of random problems chosen from past Gauss, Pascal, Cayley, and Fermat Contests. These problem sets can be used in the classroom for curriculum support and enrichment, as well as for contest preparation. There are two different mechanisms:

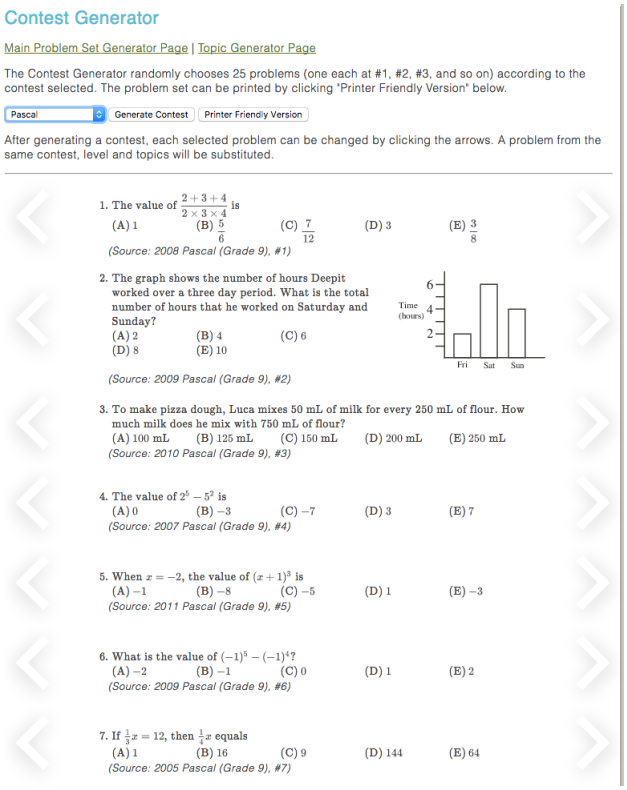
Topic Generator Use the Topic Generator

- Randomly chooses up to 30 problems according to contest, level of difficulty (Part A/B/C), and topic.
- Each selected problem can be changed by clicking the arrows. A problem from the same contest, level and topics will be substituted.
- The problem set can be printed by clicking "Printer Friendly Version".

Contest Generator Use the Contest Generator

- Randomly chooses 25 problems (one each at #1, #2, #3, and so on) according to the contest selected.
- Each selected problem can be changed by clicking the arrows. A problem from the same contest and with the same number will be substituted.
- The problem set can be printed by clicking "Printer Friendly Version".

This page is a little different. The solutions are not given. However, the question that it refers to is given so you can find the solution. Also note that in the generator it will give a chance to change each question by pressing the arrow either left or right.



Contest Generator

Main Problem Set Generator Page | Topic Generator Page

The Contest Generator randomly chooses 25 problems (one each at #1, #2, #3, and so on) according to the contest selected. The problem set can be printed by clicking "Printer Friendly Version" below.

Pascal | Generate Contest | Printer Friendly Version

After generating a contest, each selected problem can be changed by clicking the arrows. A problem from the same contest, level and topics will be substituted.

1. The value of $\frac{2+3+4}{2\times 3\times 4}$ is
(A) 1 (B) $\frac{5}{6}$ (C) $\frac{7}{12}$ (D) 3 (E) $\frac{3}{8}$
(Source: 2008 Pascal (Grade 9), #1)

2. The graph shows the number of hours Deepit worked over a three day period. What is the total number of hours that he worked on Saturday and Sunday?
(A) 2 (B) 4 (C) 6
(D) 8 (E) 10
(Source: 2009 Pascal (Grade 9), #2)

3. To make pizza dough, Luca mixes 50 mL of milk for every 250 mL of flour. How much milk does he mix with 750 mL of flour?
(A) 100 mL (B) 125 mL (C) 150 mL (D) 200 mL (E) 250 mL
(Source: 2010 Pascal (Grade 9), #3)

4. The value of $2^5 - 5^2$ is
(A) 0 (B) -3 (C) -7 (D) 3 (E) 7
(Source: 2007 Pascal (Grade 9), #4)

5. When $x = -2$, the value of $(x+1)^3$ is
(A) -1 (B) -8 (C) -5 (D) 1 (E) -3
(Source: 2011 Pascal (Grade 9), #5)

6. What is the value of $(-1)^5 - (-1)^4$?
(A) -2 (B) -1 (C) 0 (D) 1 (E) 2
(Source: 2009 Pascal (Grade 9), #6)

7. If $\frac{1}{3}x = 12$, then $\frac{1}{4}x$ equals
(A) 1 (B) 16 (C) 9 (D) 144 (E) 64
(Source: 2005 Pascal (Grade 9), #7)

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)

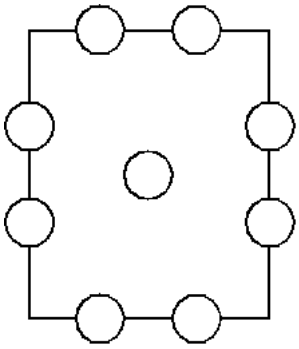
The eight digits 6, 5, 5, 4, 4, 3, 2, 1 are used to form two three-digit numbers and one two-digit number. The largest possible sum of these numbers is

(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

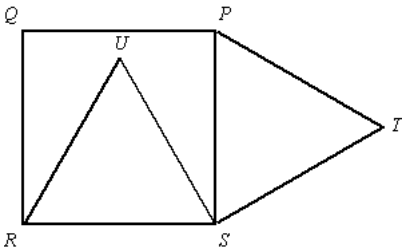
(A) 2 (B) 9 (C) 1 (D) 5 (E) 3



(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, $\cdots$, 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 machine 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