

The number 370 is special:

$$3^3 + 7^3 + 0^3 = 27 + 343 + 0 = 370$$

The number 253 is NOT special

(in this way):

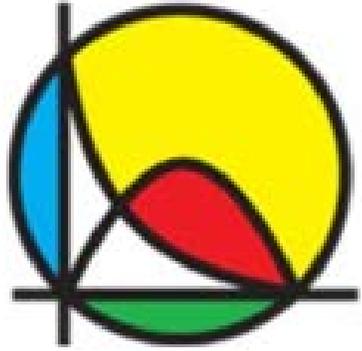
$$2^3 + 5^3 + 3^3 = 8 + 125 + 27 = 160,$$

not 253.

What is the next number,
after 370, which is special
in this way?

(If you know, shhhh!
Don't tell.)





Julia Robinson
Mathematics Festival

What is a Julia Robinson
Mathematics Festival?



Julia Robinson
Mathematics Festival

MARK SAUL, Ph.D.
Executive Director

What is a Julia Robinson Mathematics Festival?

- a) What is a Julia Robinson Mathematics Festival?
- b) Who was Julia Robinson?
- c) What is mathematics?

CONTESTS	FESTIVALS
Strict time limits	Students determine their own time limits
Motivation through competition	Motivation through social interaction
Filters out girls and minority students	Retains girls and minority students
Affords opportunities for professional development for teachers	Affords opportunities for professional development for teachers
Draws in the entire mathematical community	Draws in the entire mathematical community



A PROGRAM OF THE AMERICAN INSTITUTE OF MATHEMATICS ¶

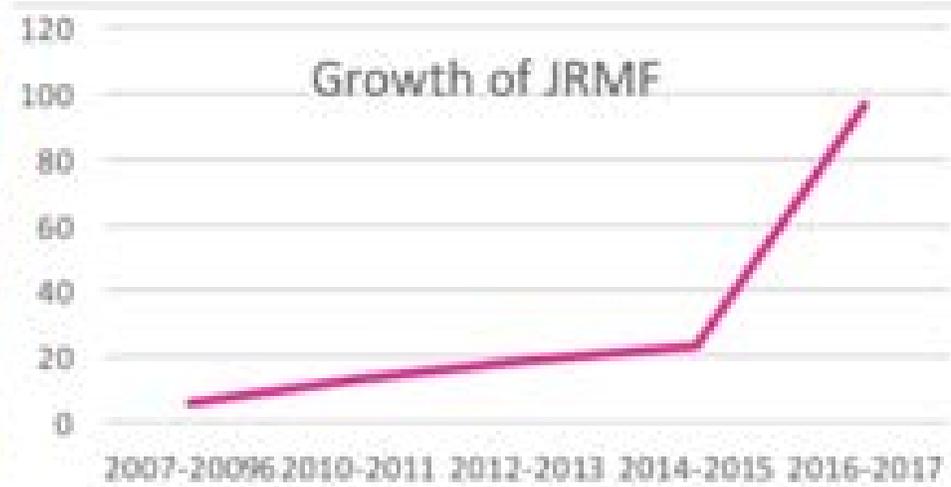
600 East Brokaw Road ↵

San Jose, CA 95112 ¶

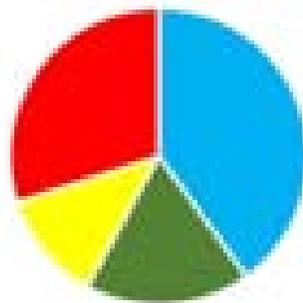
408-350-2088 ¶

More than 50 festivals last year, in 16 states and 6 foreign countries.

Festivals are organized locally, with support from the national JRMF organization.



Level of students served



- combined levels
- elementary
- high school
- middle school



What you need:

About 100 kids (any age)

A space for about 10 tables and 100 kids

A dozen 'facilitators' who know the mathematics and can support the kids working on problems

Publicity, signage, snacks.



How we can help:

Publicity materials

Website (www.jrmf.org), including a registration system.

Activities (We have a 'bank' of almost 100 activities which have been tried out in different venues.)

Experience



FAQ's

Question: What age group?

Answer: You tell us and we can help you find activities for that age group.

Questions: What level of student (advanced, average, remedial)?

Answer: Same answer.

Question: When does the Festival occur?

Answer: When you schedule it.

Question: Are there any fees associated with your services?

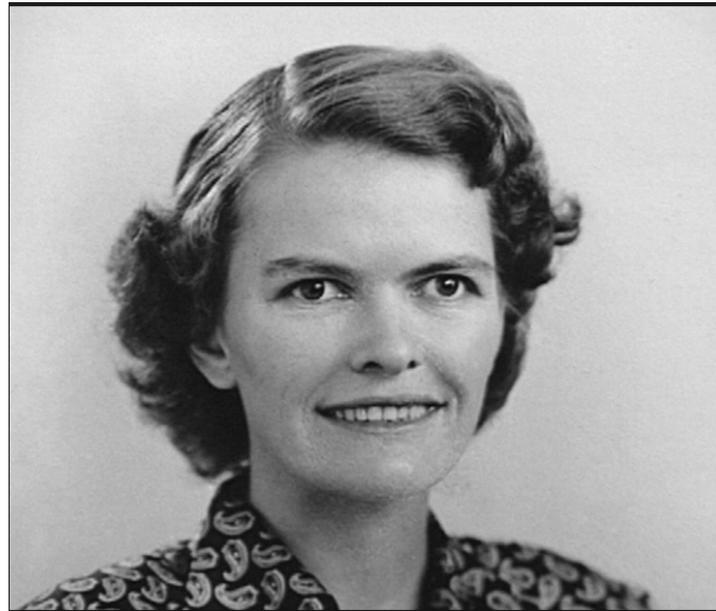
Answer: Not unless the service is specifically developed for your event



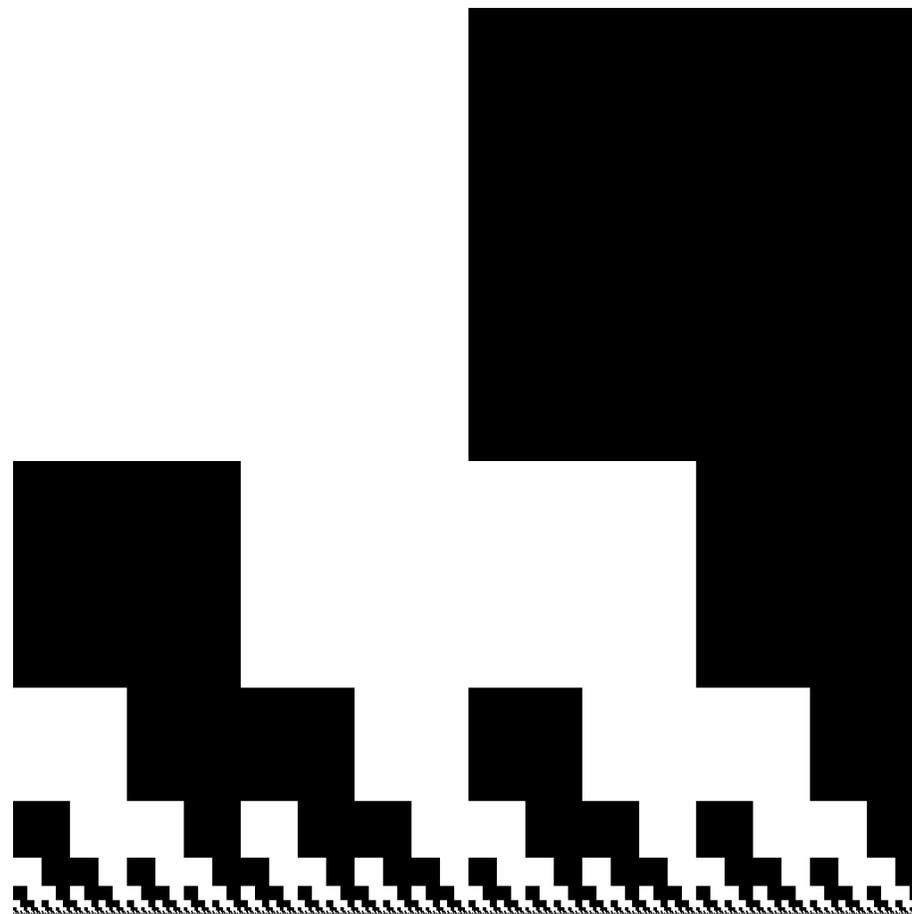
Julia Hall Bowman Robinson

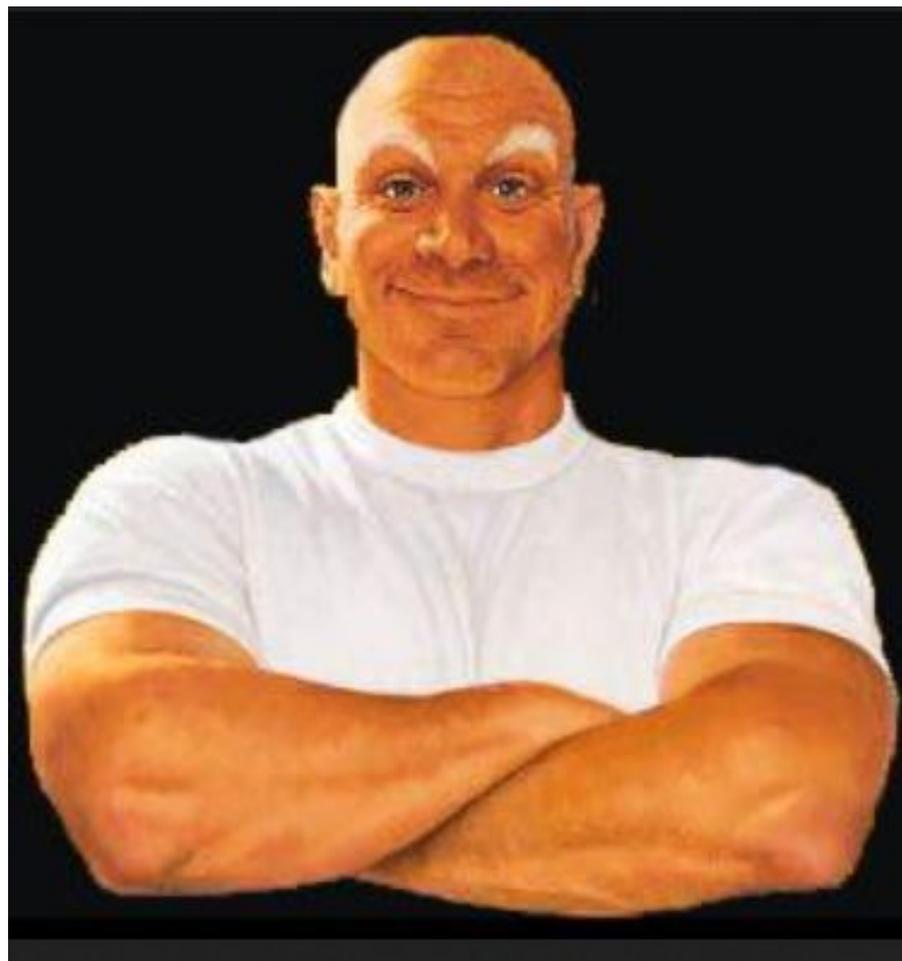
(December 8, 1919 – July 30, 1985)

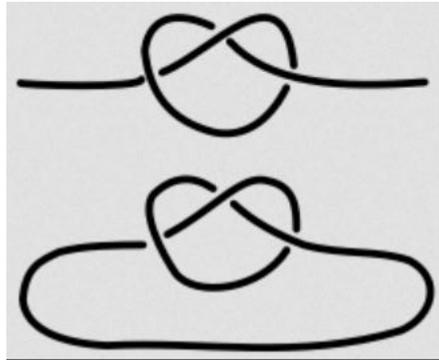
was an [American mathematician](#) best known for her work on [decision problems](#) and [Hilbert's tenth problem](#).



BINARY GRAY CODE







TOPOLOGY and KNOTS

9 7

5 8

Using the four arithmetic operations, and ONE COPY of EACH of these numbers, form the number 24.

9 7

5 8

Using the four arithmetic operations, and ONE COPY of EACH of these numbers, form the number 24.

One solution: $8(7 - (9-5))$.

Kids will say: 9 minus 5 is 4.

7 minus 4 = 3

8 times 3 is 24.

...and we can explore
alternative formulations.

MATHEMATICS IS NOT ABOUT NUMBERS.

IT'S NOT ABOUT FIGURES.

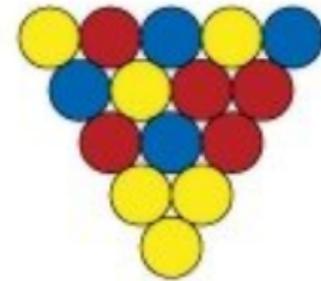
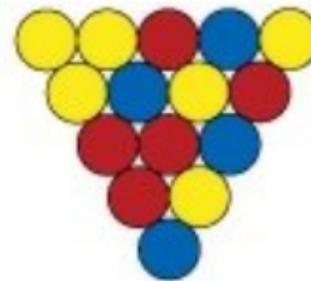
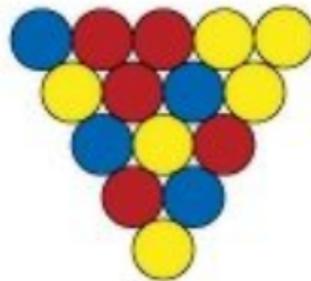
MATHEMATICS IS ABOUT FIGURING THINGS
OUT.



Color Triangle Challenge

The Rules

If the two dots above are the same color, then the third dot below matches both. If the two dots above are different colors, then the third one below is different from either.



The Challenge

Take a row of ten dots colored as follows, and place a row of nine dots underneath it, coloring them according to our rule. Continue with eight dots underneath that and so on, all the way to a single dot.



What will be the color of that final dot?

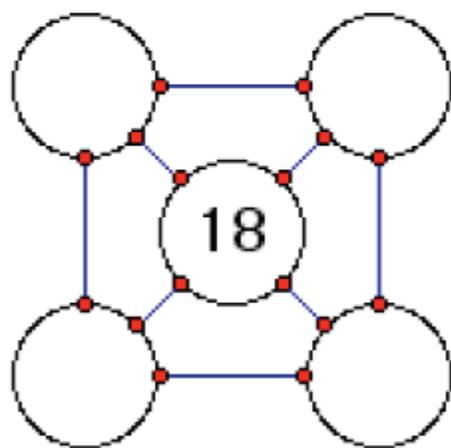




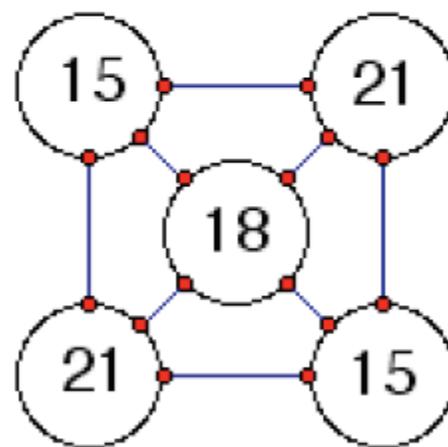
Digit Sums and Graphs

In each diagram, fill in the circles with positive whole numbers in such a way that each circle's number is the sum of the digits of all the numbers it is connected to. Thanks to Erich Friedman for this idea!

Example



Solution

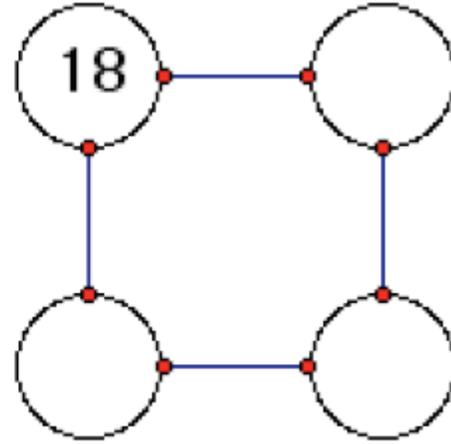
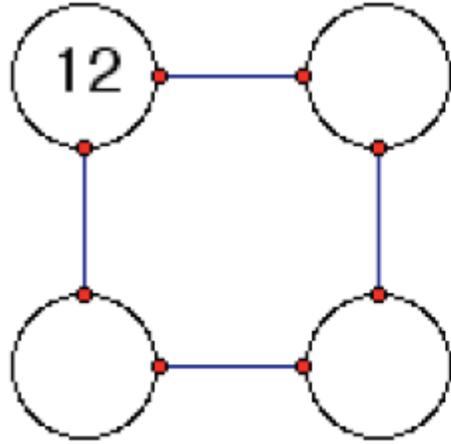
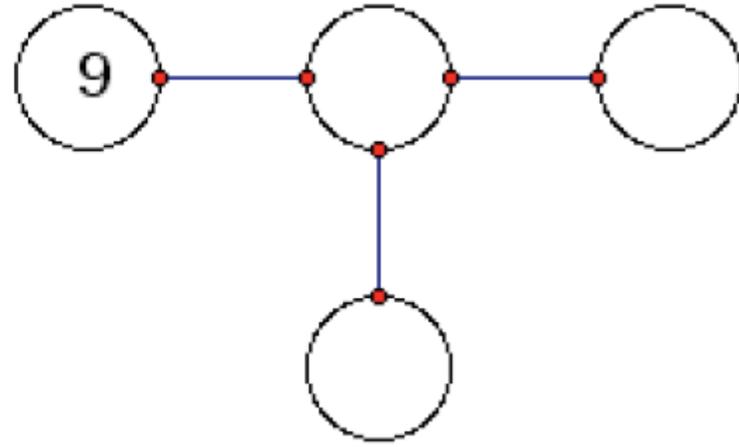
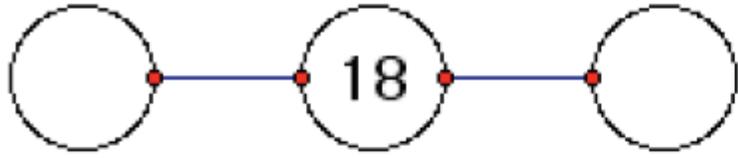


The solution works because

$15 = (2+1) + (1+8) + (2+1)$ for two of the corners,

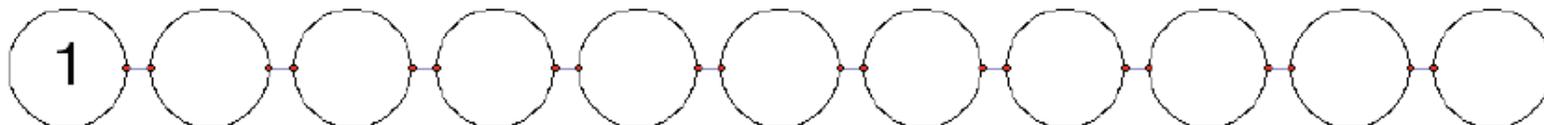
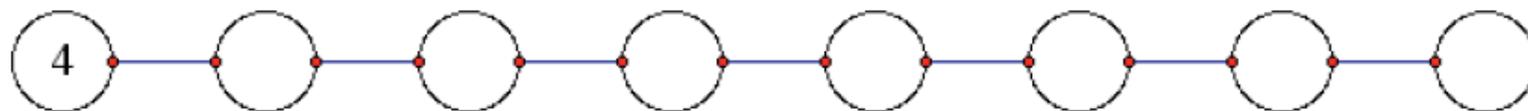
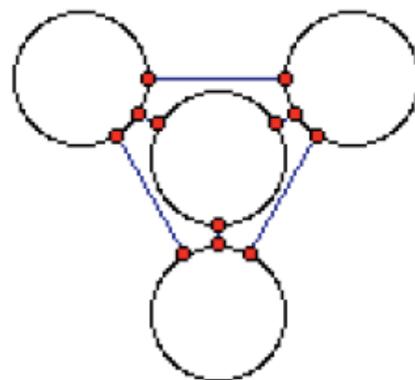
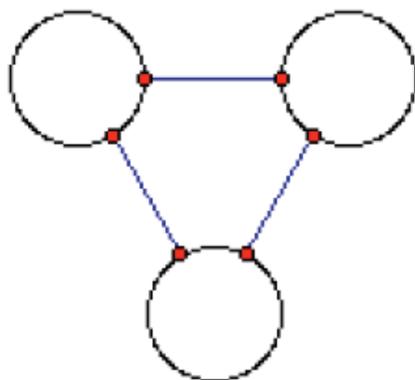
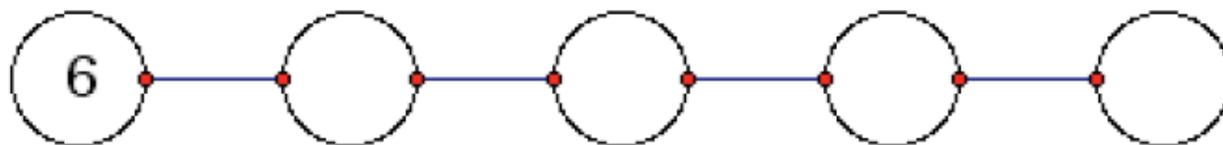
$21 = (1+5) + (1+8) + (1+5)$ for the other two corners, and

$18 = (1+5) + (2+1) + (1+5) + (2+1)$ in the center.





Some of these may have more than one solution!



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What is the next number,
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Answer: 371.

But are there any other such numbers?



Julia Robinson
Mathematics Festival

THANK YOU FOR YOUR ATTENTION

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www.jrmf.org