

ARITHMAGONS

ACTIVITY GUIDE

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**Julia Robinson
Mathematics
Festival**

Materials and Setup

Per table (assuming 5 students per table), you will need:

Per Table	Material Preparation	
45 colored tokens		
45 number stickers (need five sets of numbers 1 to 9)	Using one color for each set, put the numbers 1 to 9 on the counters.	
3 copies of Instructions	2 pages each <i>can be printed double-sided</i>	p. 6-7
5 copies of Arithmagons Number Set	1 page each	p. 8
5 copies of Tasks	8 pages each <i>can be printed double-sided</i>	p. 9-16
1 copy of Table Sign	1 page <i>print on cardstock for sturdiness</i>	p. 17

Per Table	Purchasing Materials		
colored tokens	pack of 135 for \$8.49		
number stickers	pack of 2500 for \$6.49		
28 plastic sheet protectors	pack of 100 for \$7.67	pack of 500 for \$26.99	These are recommended in order to protect the documents that students will be handling.



Objective

Put a number in each circle.

Rules:

1. Put a number in each circle. These circles are also called vertices.
2. The number on each line must be the sum of the numbers on its vertices for Puzzles 1 to 20.
3. For Puzzles 21 to 24, the number inside each triangle must be the sum of the numbers on its vertices.

Materials

Each Arithmagons table should be prepped for 5 stations.

Each station needs:

1. Colored tokens numbered 1 through 9.
2. Arithmagons instructions.
3. Arithmagons number set.
4. Arithmagons tasks.

How to Play

Introduce the activity without overexplaining it and without telling what strategies students might want to use. As much as possible, avoid giving away answers. Students should be encouraged to explore, experiment, and learn from their mistakes.

1. Have the numbered tokens laid out on the Number Set sheet or, with young students, have them place the number tokens on the correct place on the sheet for you.
2. Demonstrate the rules by placing number tokens in the circles on the first puzzle and showing the student how to find the sums around it.
3. Have the student help you place the first few numbers.
4. Have the student solve the first task and then explore the next tasks.

Standards

1. Make sense of problems and persevere in solving them. CCSS.MP1
2. Model with mathematics. CCSS.MP4
3. Attend to precision. CCSS.MP6
4. Look for and express regularity in repeated reasoning. CCSS.MATH.PRACTICE.MP8

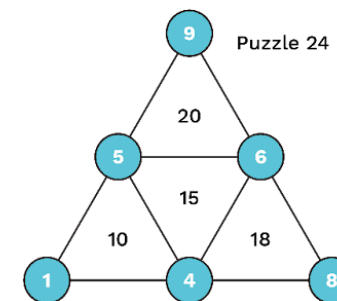
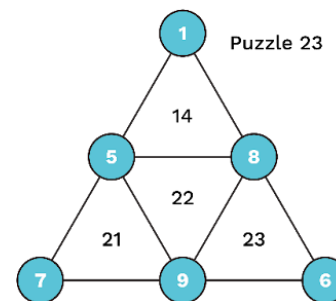
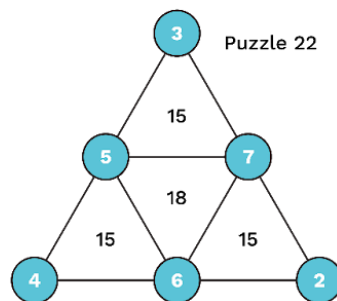
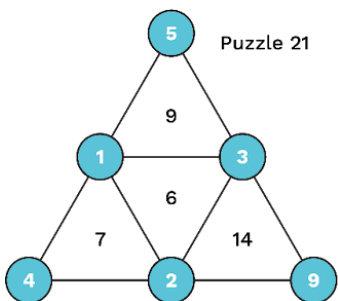
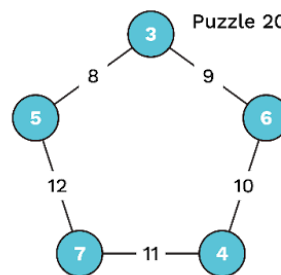
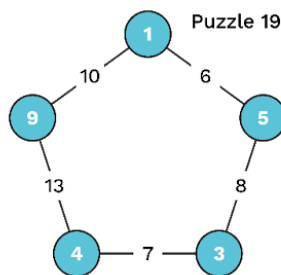
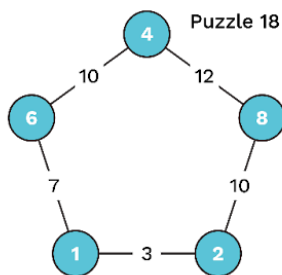
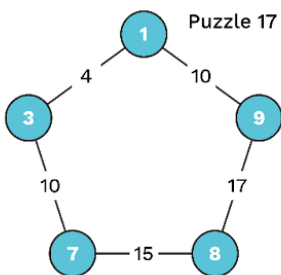
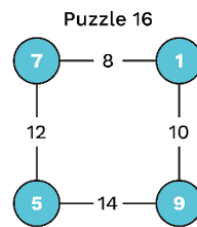
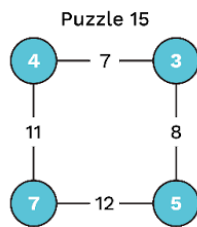
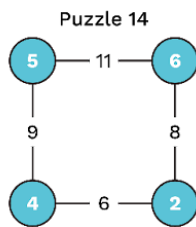
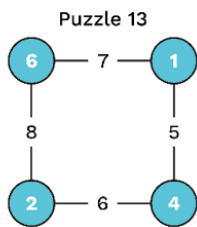
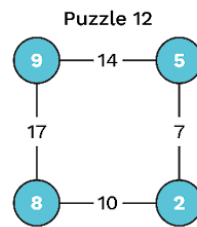
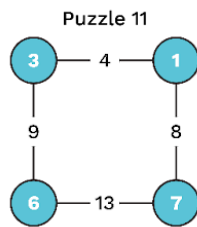
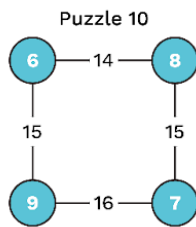
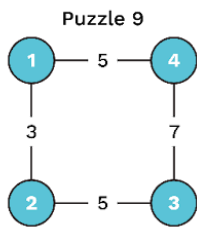
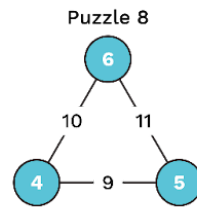
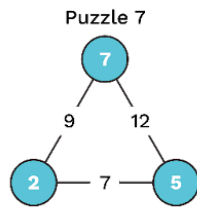
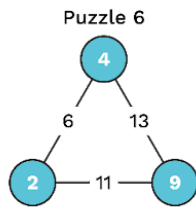
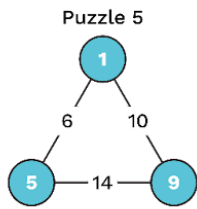
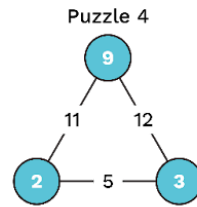
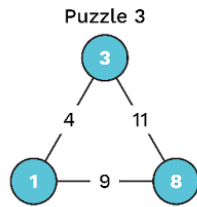
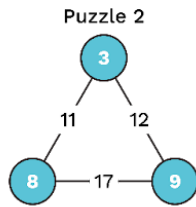
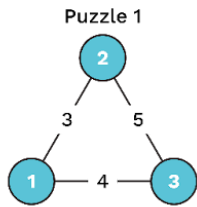


Asking Good Questions

1. Ask questions about confidence.
 - a. When a student asks you “Is this right?”, instead of saying “yes” or “no” right away, ask them how confident they are in their answer. Here are some examples:
 - i. “Maybe. What do you think? How confident are you?”
 - ii. “On a scale of 1-5, how confident are you in your answer?”
 - b. If a student is not confident in their answer, follow up by asking “What would help you feel more confident in your answer?” or “Why do you not feel confident?” This helps you determine how best to help the student through their explorations.
2. Ask students about choices.
 - a. When a student is stuck or shows you a wrong answer, instead of jumping in and showing the student the correct answer, start by asking about the choices that the student made along the way. Here are some suggested steps to follow:
 - i. Start from the beginning.
 - ii. Ask students to show you what they’ve tried so far.
 - iii. When the student gets to a point where they have different choices, ask the student “What other choices can you make here?”
 - iv. Have the student make a different choice and try to solve the puzzle. This helps the student see that they have the power to make different choices during an activity, and they’ll start to do this on their own in the future.
 - v. If you’re familiar with the puzzle or a particular solution, stop the student only when a different choice will help them get to the solution. This will help them feel successful faster without you giving away too much of the answer.
3. Ask students about strategies.
 - a. If a student is getting into the activity and has been doing it for a while, ask the student if there are any strategies they’ve come up with to help them solve the puzzle or win the game.
 - b. Follow up by asking if they think their strategies will work for all puzzles and/or larger puzzles, more complex puzzles, etc. Have the student explore more complex puzzles to test out their strategies.
 - c. This is a great way to encourage a student to dive deeper into an activity and to start looking for patterns, structure, and proofs.

Answers

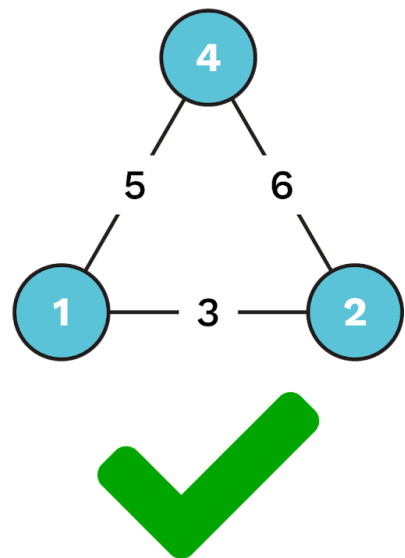
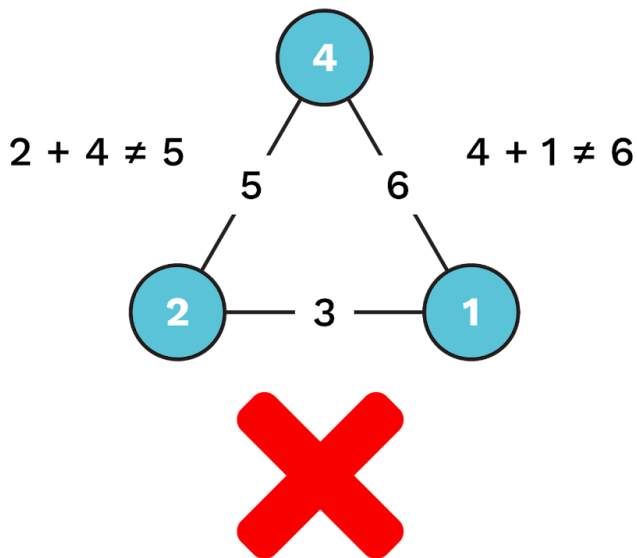
Some puzzles have more than one answer.



Arithmagons Instructions

Rules:

1. Put a number in each circle. These circles are also called **vertices**.
2. The number on each line must be the sum of the numbers on its vertices.

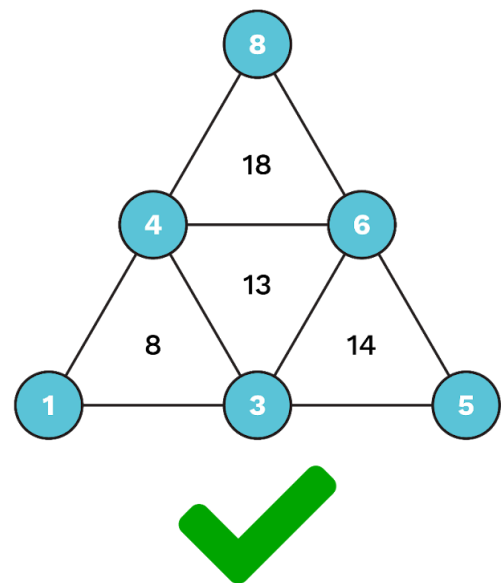
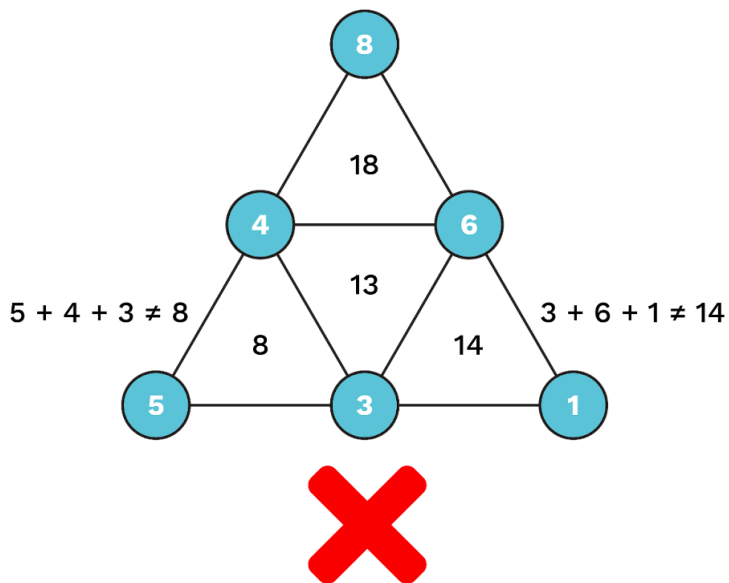


This page is for Puzzles 1 - 20. Flip me over for Puzzles 21 - 24.

Arithmagons Instructions

Rules:

1. Put a number in each circle.
2. The number inside each triangle must be the sum of the numbers on its vertices.



This page is for Puzzles 21 - 24. Flip me over for Puzzles 1 - 20.

Arithmagons

1

2

3

4

5

6

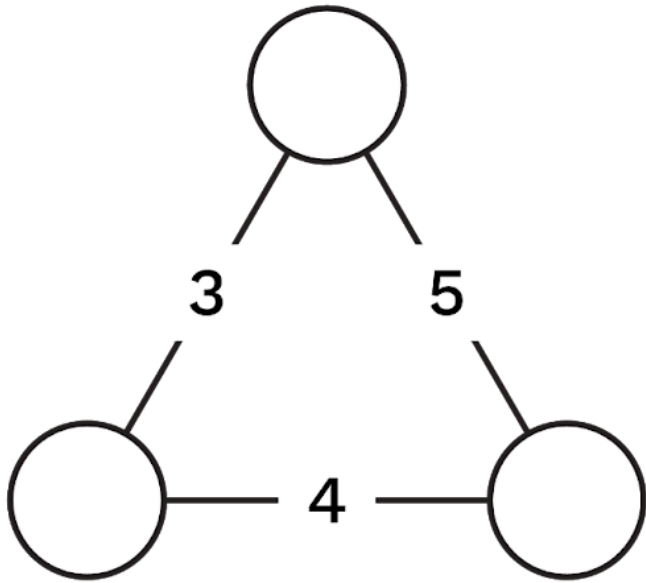
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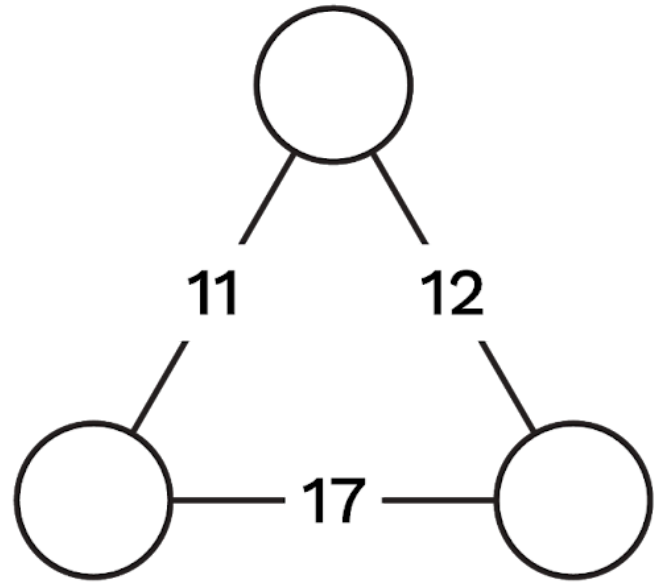
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Arithmagons

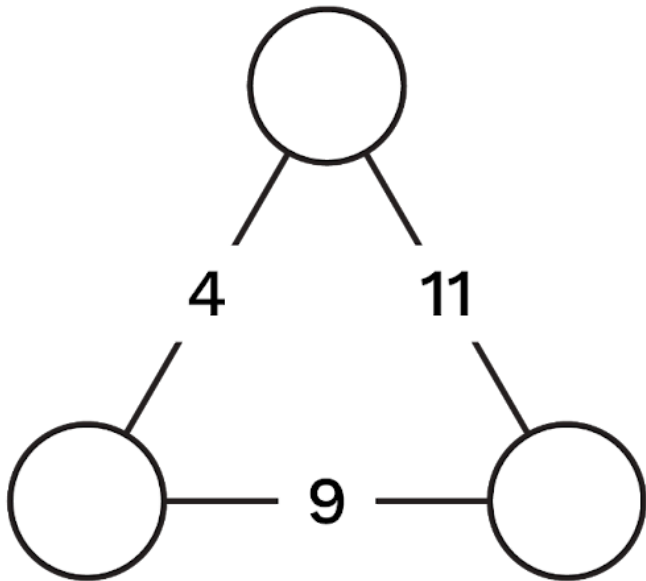
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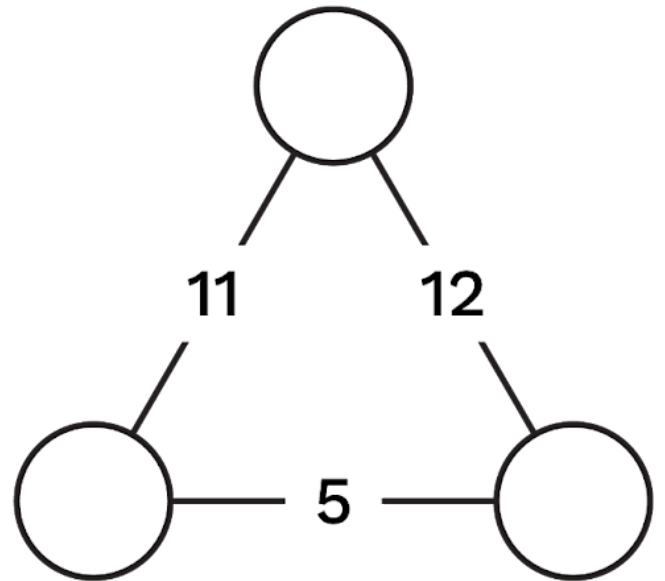
Puzzle 2



Puzzle 3

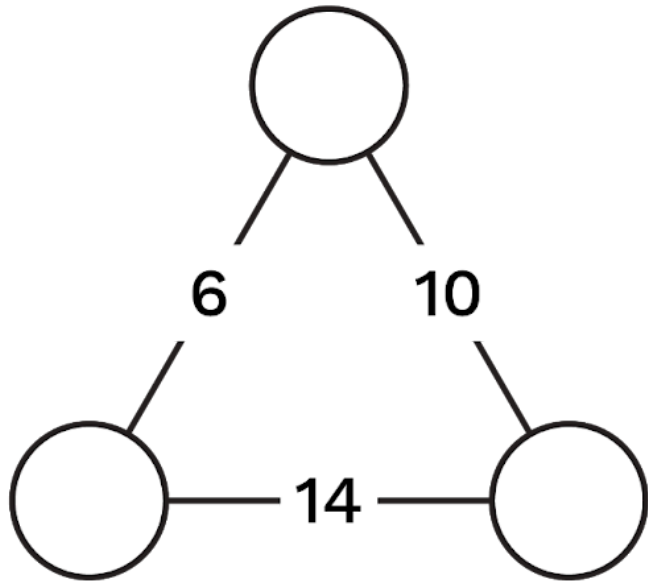


Puzzle 4

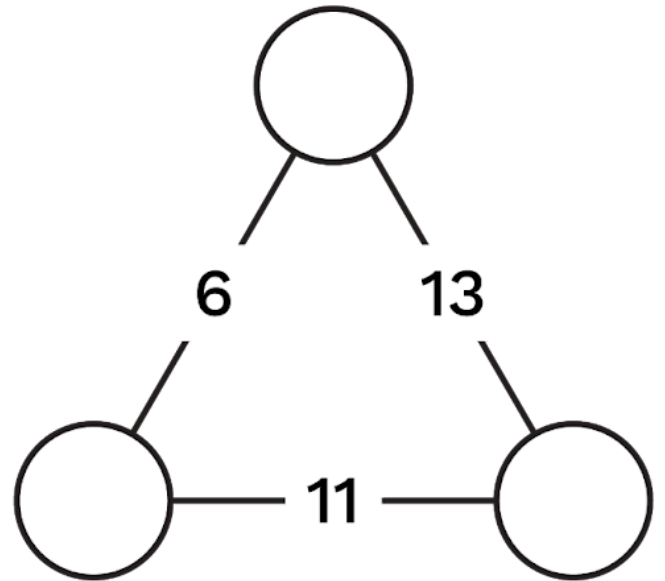


Arithmagons

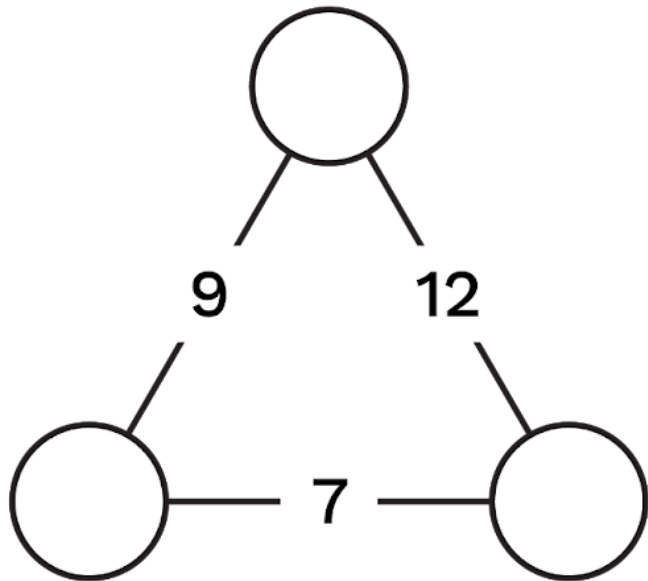
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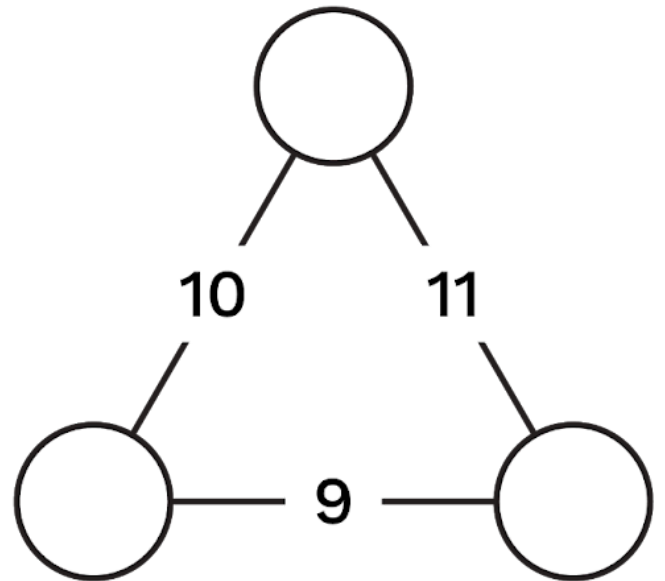
Puzzle 6



Puzzle 7

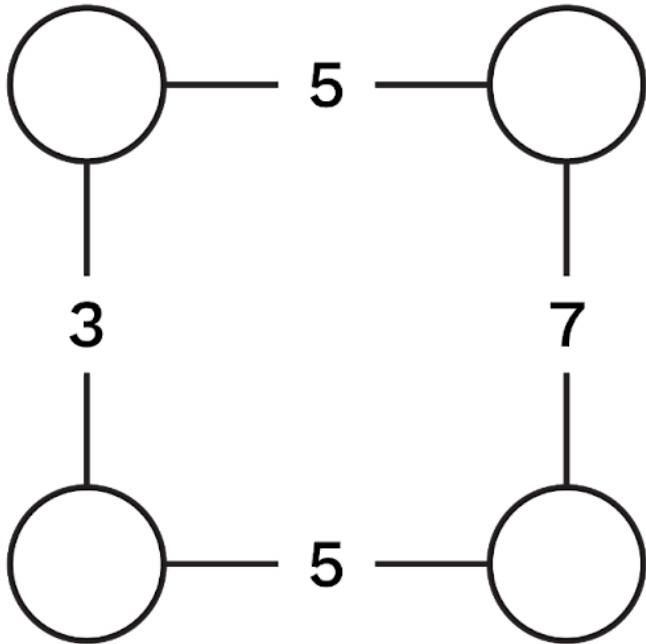


Puzzle 8

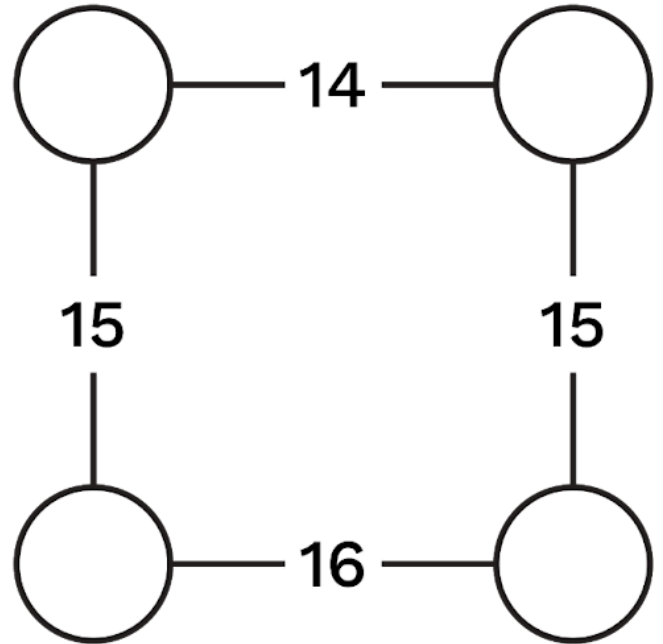


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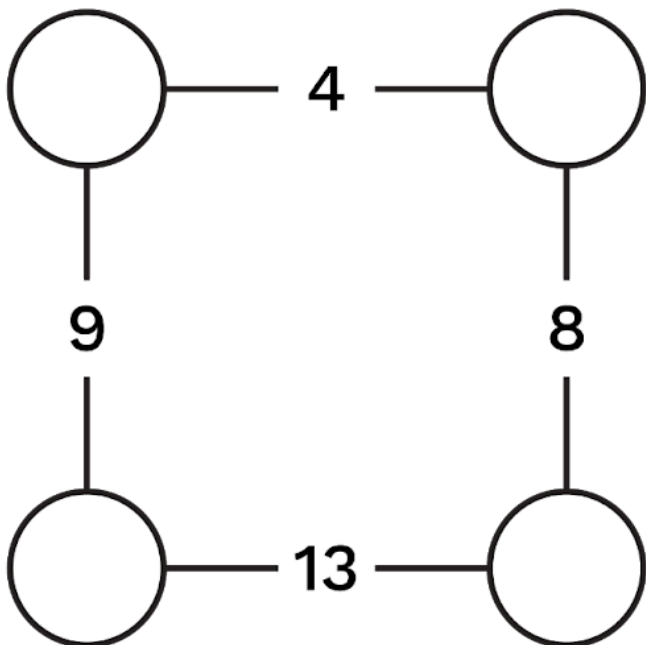
Puzzle 9



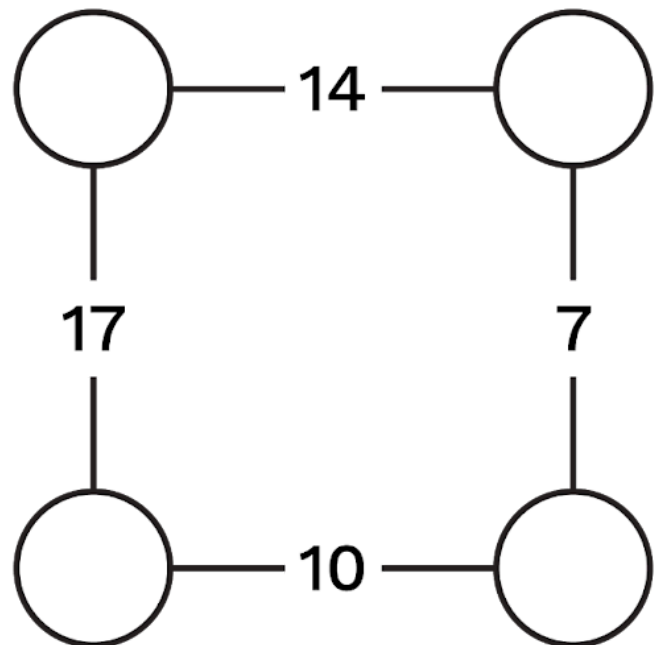
Puzzle 10



Puzzle 11

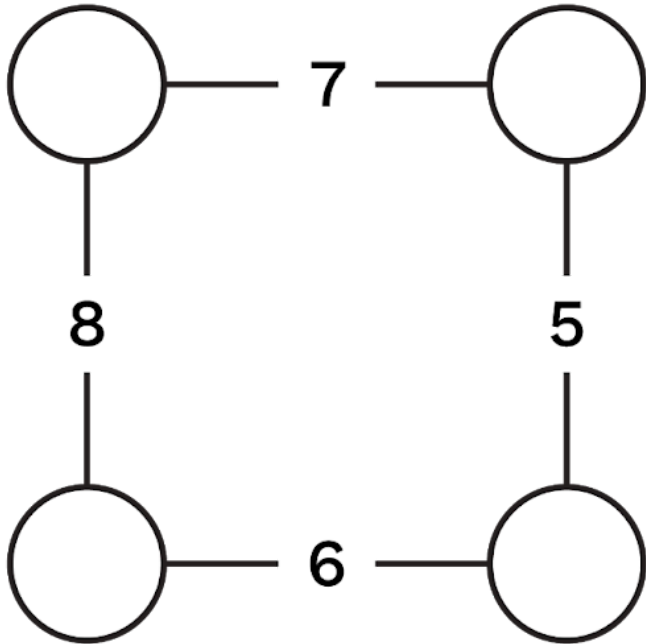


Puzzle 12

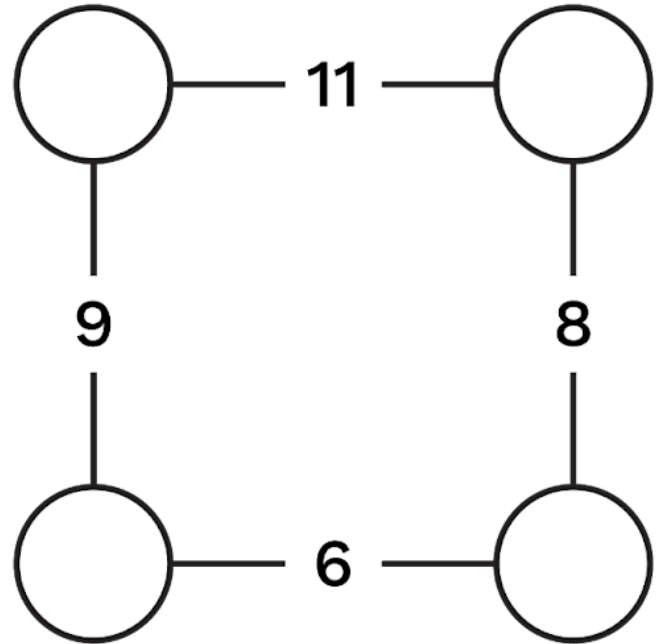


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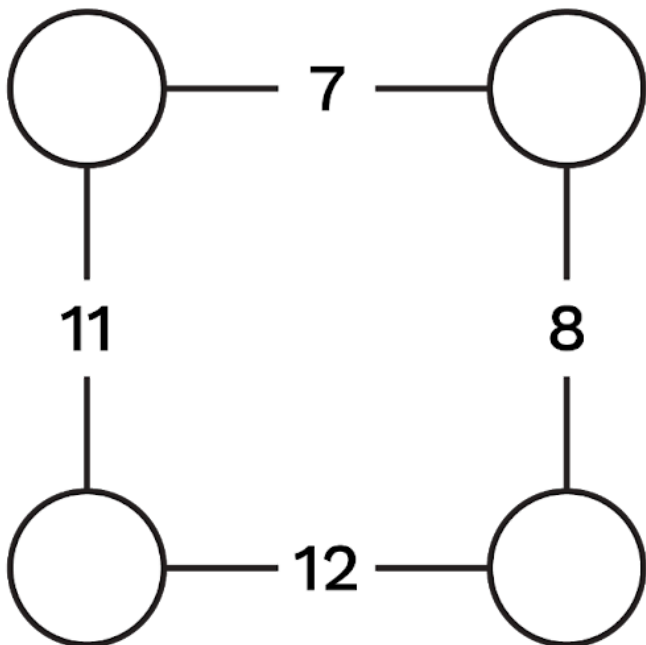
Puzzle 13



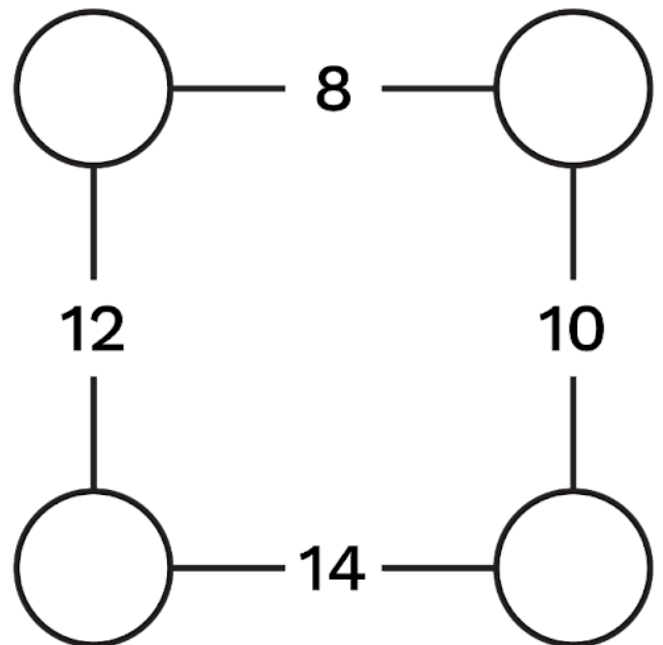
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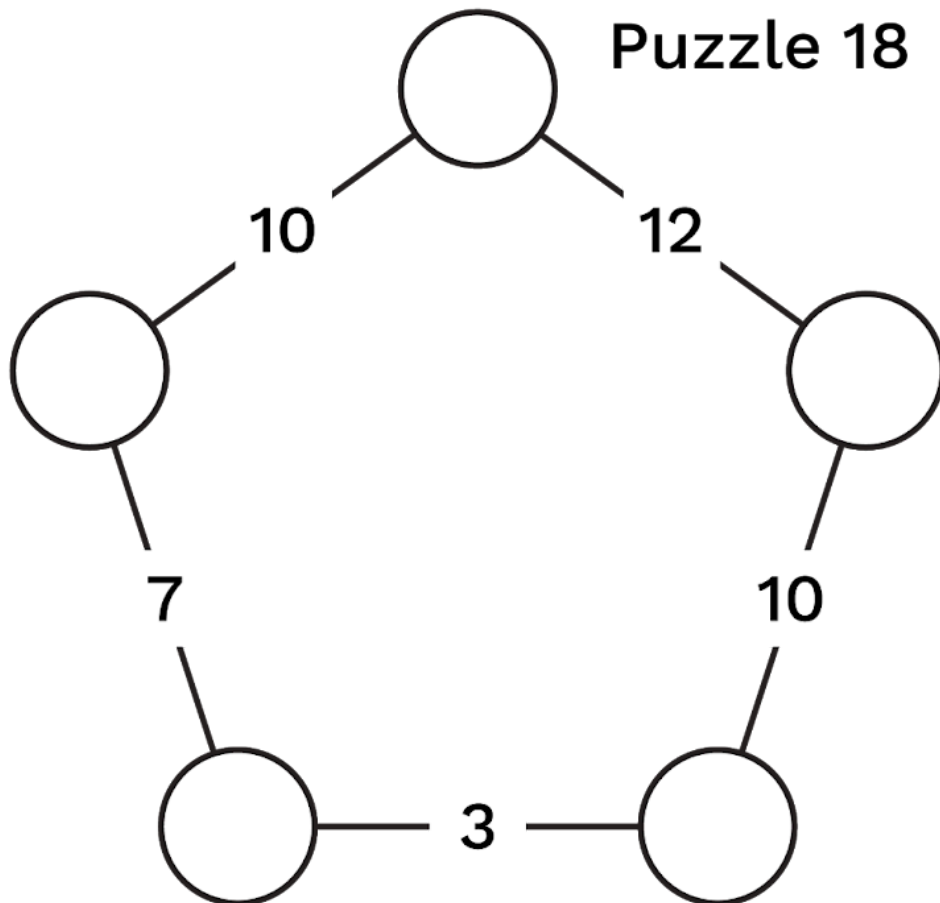
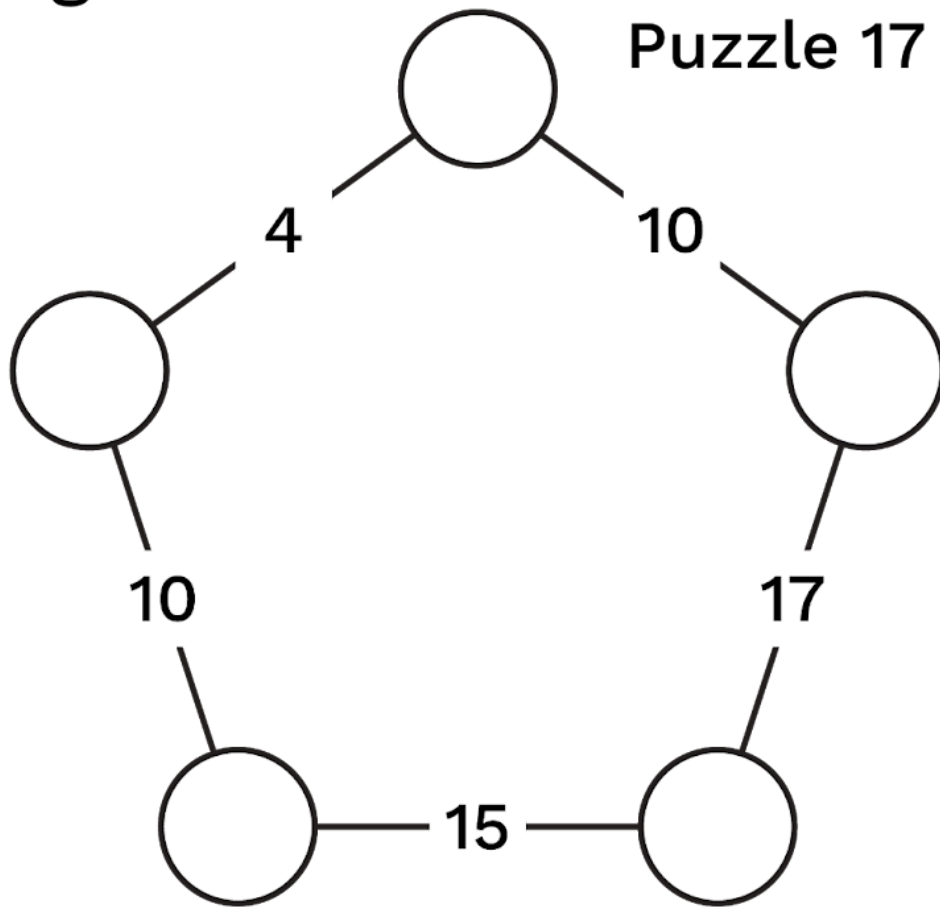
Puzzle 15



Puzzle 16

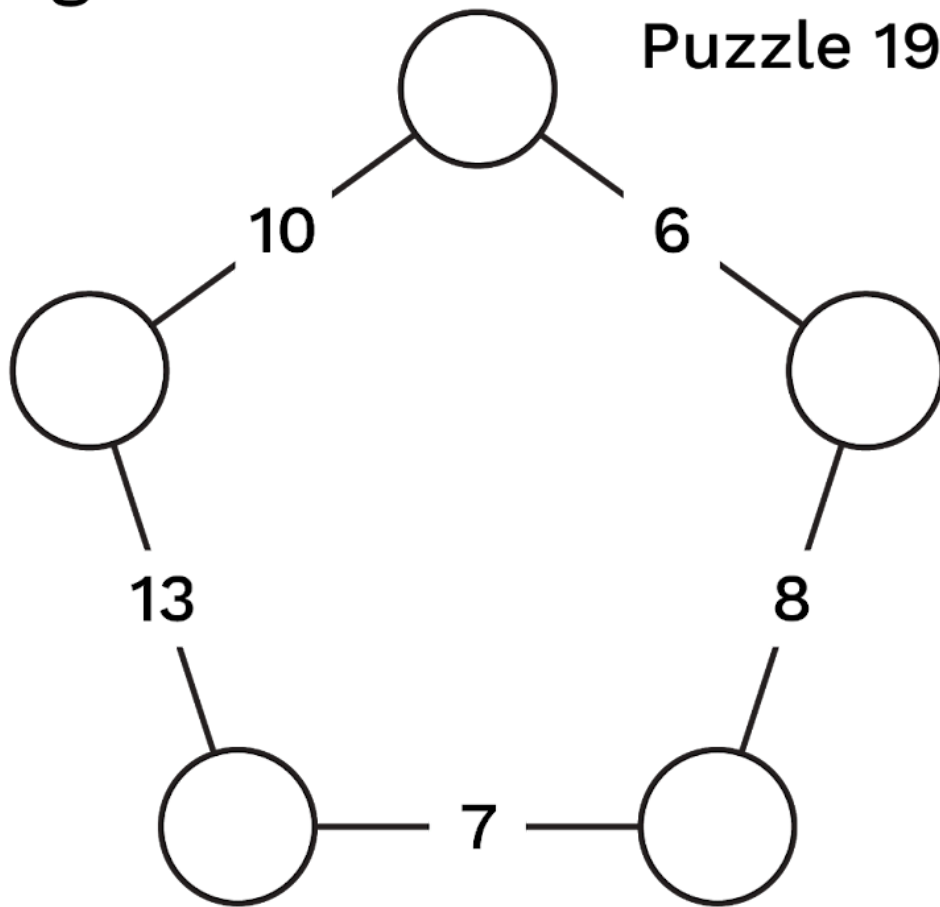


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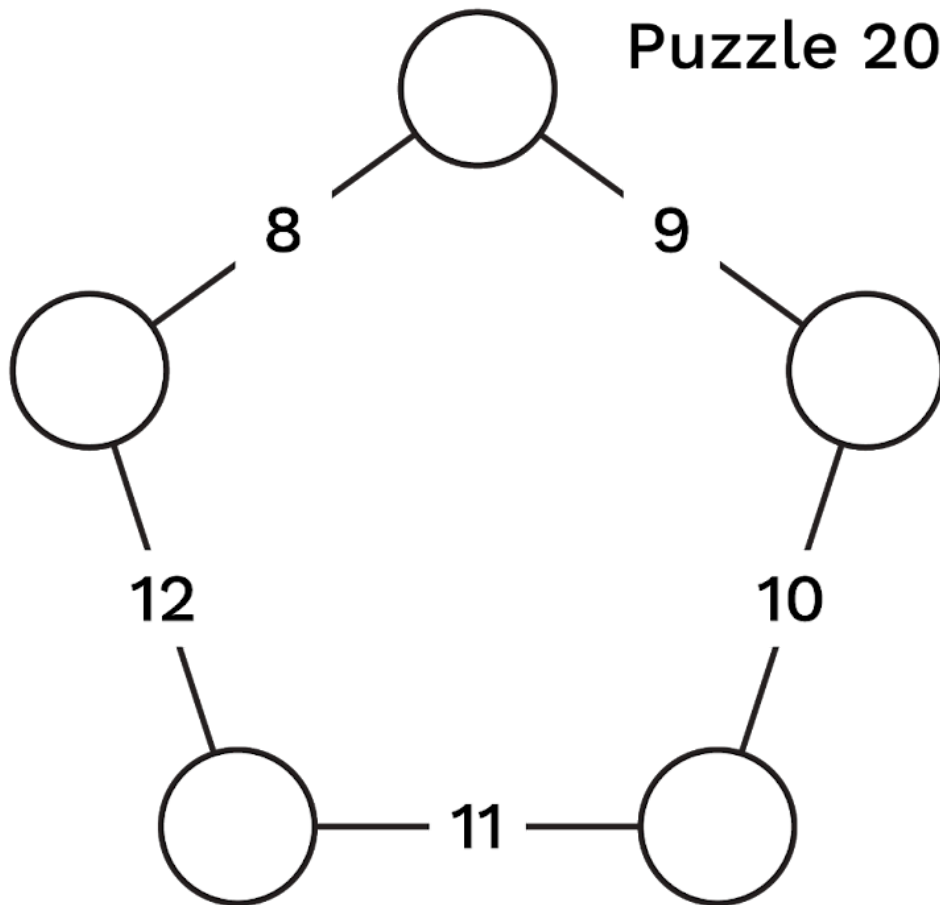


Arithmagons

Puzzle 19

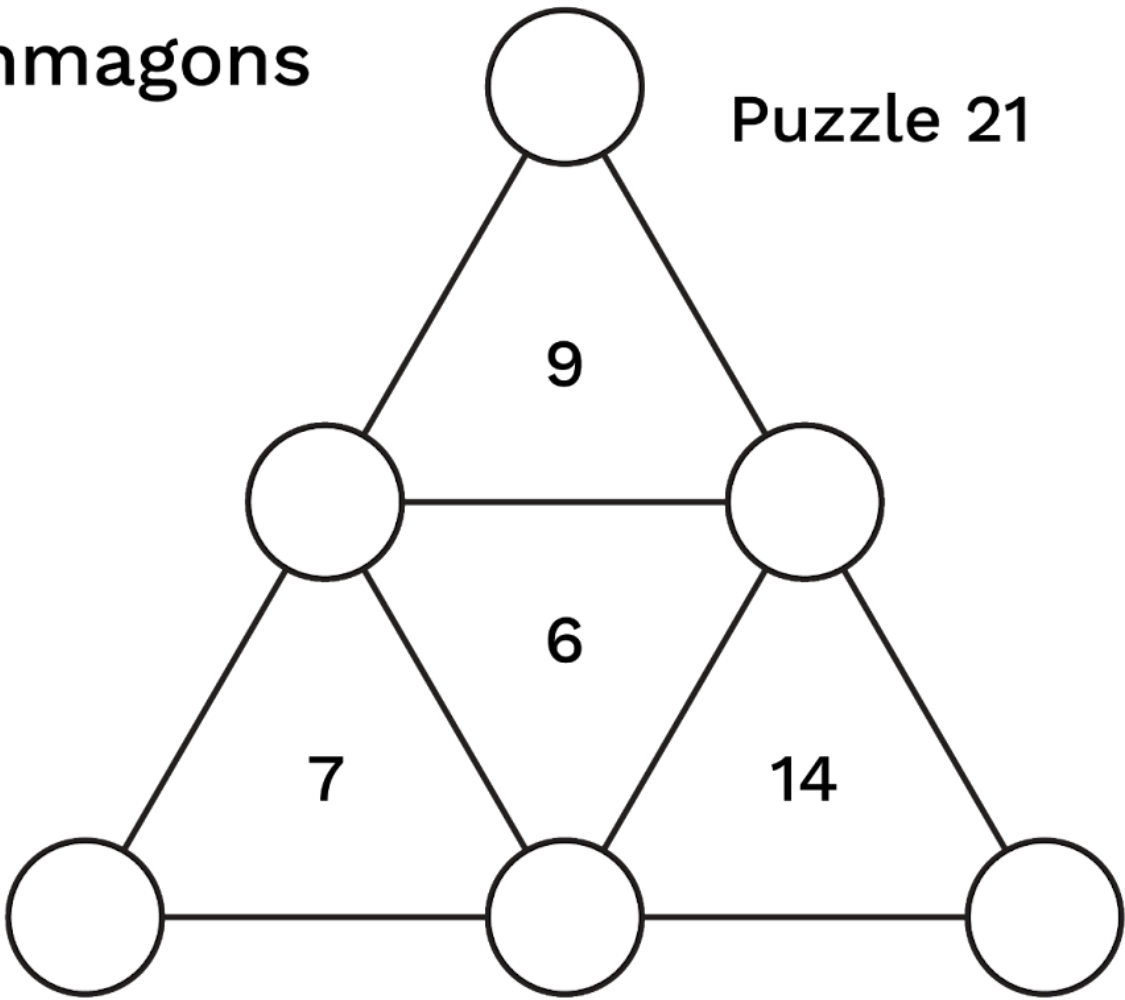


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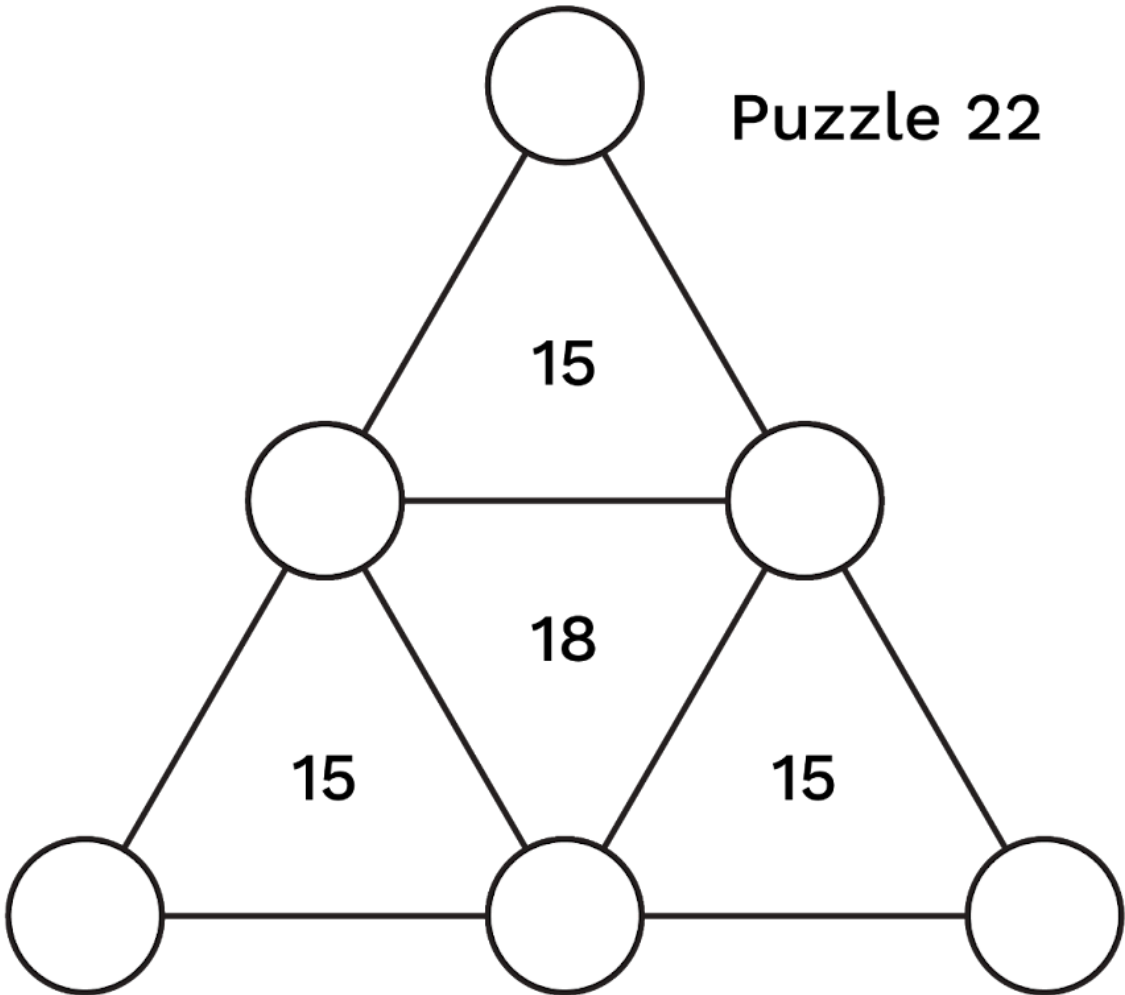


Arithmagons

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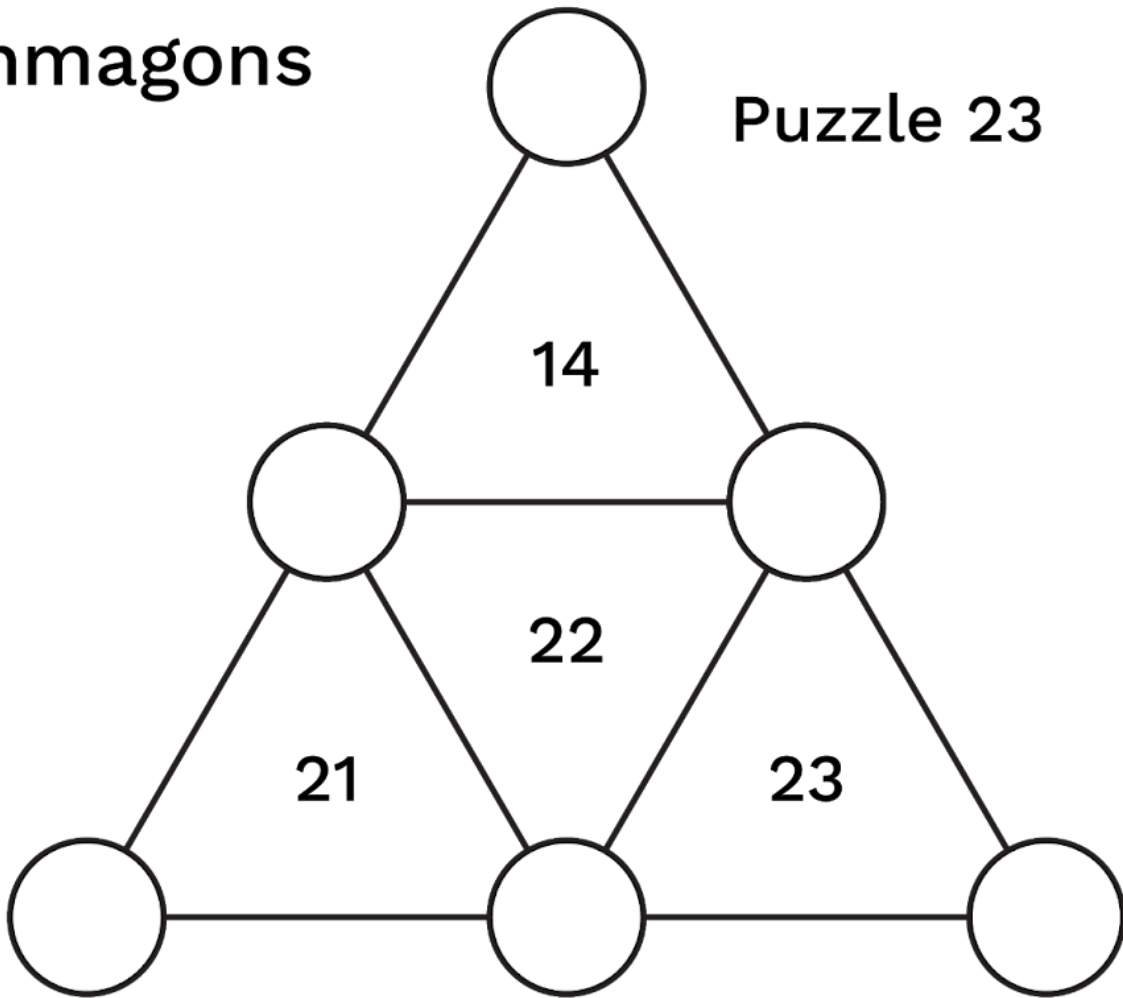


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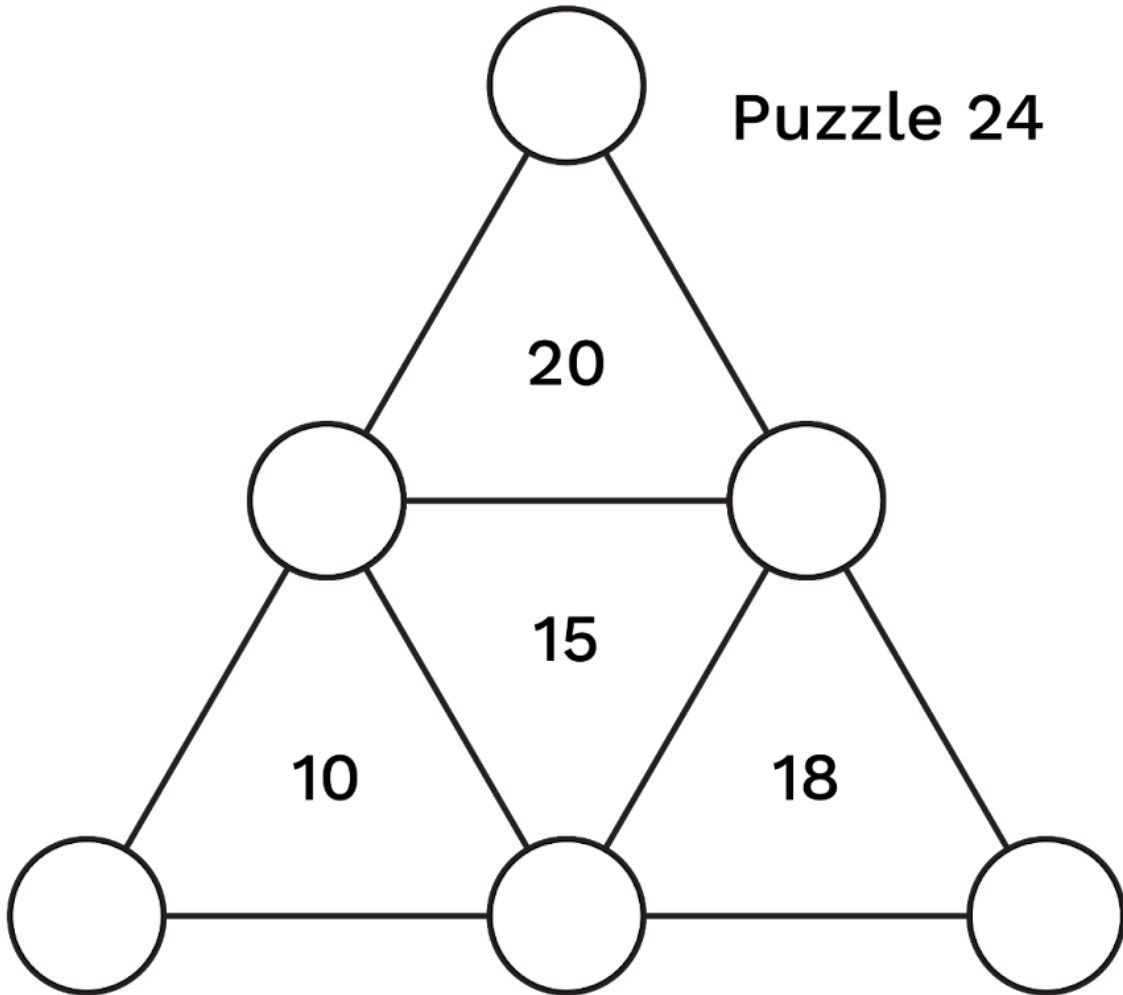


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Puzzle 23

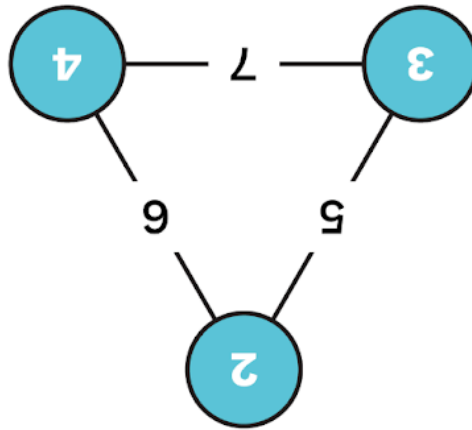


Puzzle 24





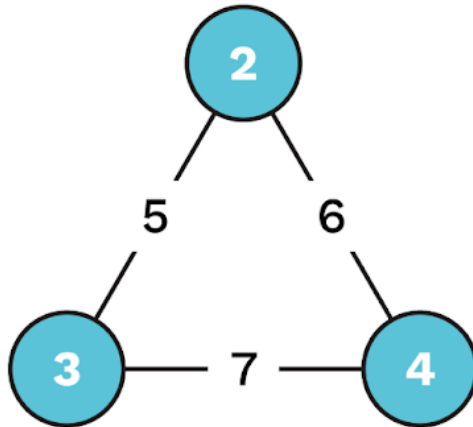
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