



The image shows a YouTube video player interface. The video title is "Mystery of the Missing Dollar Puzzle". The channel name is "AmazingMathGuy" with 14 videos. The video has 3,015 views, 14 likes, and 1 dislike. The video player shows a progress bar at 0:02 / 4:30. The video content itself is a blackboard with white text that reads "THE MYSTERY OF THE VANISHING DOLLAR".

THE MYSTERY
OF THE
VANISHING DOLLAR

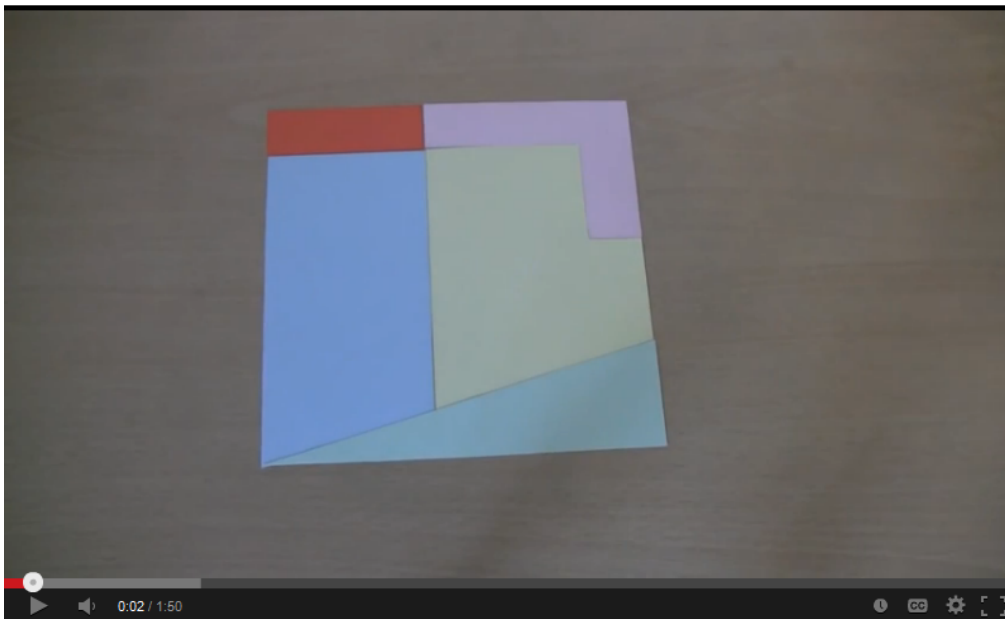
Mystery of the Missing Dollar Puzzle

AmazingMathGuy · 14 videos

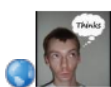
3,015

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14 1



A Maths Puzzle: The Missing Square Solution



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1.6

Reasoning to Solve Problems

GOAL

Solve problems using inductive or deductive reasoning.

EXPLORE...

- Suppose that you are lost in the woods for hours and come upon a cabin. In the cabin, you find a lantern, a candle, a wood stove with wood in it, and a match. What do you light first?

**SAMPLE ANSWER**

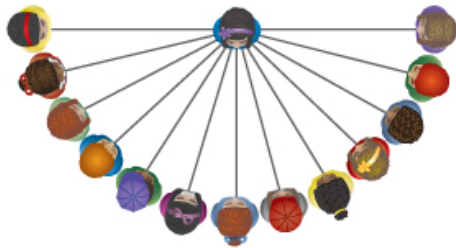
I would light the match first. If I didn't, I couldn't light any of the other items. I would light the candle next, since it would stay lit for longer than the match and would allow me to light the other two items. Also, it's less likely that I would make an error or fail when lighting the candle. The lantern and the stove would be more difficult to light.

APPLY the Math

EXAMPLE 1 Using reasoning to solve a problem

The members of a recently selected varsity basketball team met each other at their first team meeting. Each person shook the hand of every other person. The team had 12 players and 2 coaches. How many handshakes were exchanged?

Kim's Solution



I decided to think about how many times each person shook hands. There were 14 people in total, so person 1 shook hands with each of the other 13 people.

13 handshakes



Person 2 had already shaken hands with person 1. Person 2 shook hands with each of the remaining 12 people.

13 + 12 handshakes

$$13 + 12 + 11 + 10 + 9 + 8 + 7 + 6 + 5 + 4 + 3 + 2 + 1 = 91 \text{ handshakes}$$

14×13	182
Ans/2	91

of handshakes continued until there were left when the last handshake happened.

Your Turn

Discuss, with a partner, whether Kim used inductive or deductive thinking in her solution. How do you know?

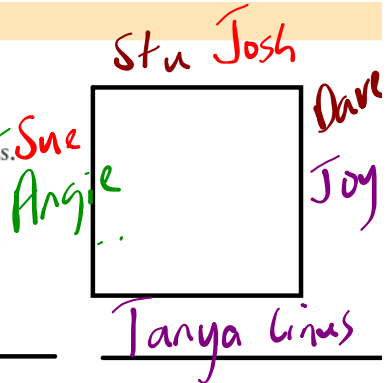
Answer



Kim used inductive reasoning. To solve the problem, Kim determined the new number of handshakes based on the pattern identified in the first two cases. I know that Kim used inductive reasoning because the result was specific to this number of people, not a generalization that would be true for any number of people.

EXAMPLE 2 Using reasoning to solve a problem

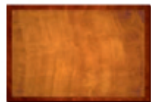
Sue signed up for games at her school's fun night. Seven other people were assigned to her group, making up four pairs of partners. The other members of her group were Dave, Angie, Josh, Tanya, Joy, Stu, and Linus. When the games started, Dave and his partner were to the left of Stu. Across from Dave was Sue, who was to the right of Josh. Dave's brother's partner, Tanya, was across from Stu. Joy was not on Stu's right.



Name the four pairs of partners.

Vicky's Solution

~~Dave~~
~~Angie~~
~~Josh~~
~~Tanya~~
~~Joy~~
~~Stu~~
~~Linus~~
~~Sue~~



I drew a rectangle to represent a table. I made a list of the students' names so I could cross them off as I put them in place.

~~Dave~~
~~Angie~~
~~Josh~~
~~Tanya~~
~~Joy~~
~~Stu~~
~~Linus~~
~~Sue~~



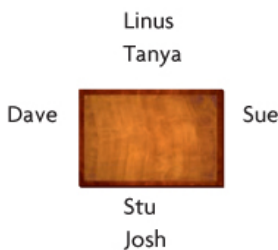
The first names I wrote in were Dave and Stu, since they were the first two mentioned. It didn't matter where I started, as long as I kept the relationships of left, right, and across the table. I crossed Dave and Stu off my list.

~~Dave~~
~~Angie~~
~~Josh~~
~~Tanya~~
~~Joy~~
~~Stu~~
~~Linus~~
~~Sue~~



I knew that Sue was across from Dave and to the right of Josh. I crossed Sue and Josh off my list.

~~Dave~~
~~Angie~~
~~Josh~~
~~Tanya~~
~~Joy~~
~~Stu~~
~~Linus~~
~~Sue~~



The next clue mentioned that Dave's brother and his partner Tanya were across from Stu. The only male name left was Linus, so Linus and Tanya were partners. I crossed their names off my list.

~~Dave~~
~~Angie~~
~~Josh~~
~~Tanya~~
~~Joy~~
~~Stu~~
~~Linus~~
~~Sue~~



If Joy was not on Stu's right, then she must have been on his left. Therefore, she must have been Dave's partner. So, the last person to match was Angie with Sue.

The four pairs of partners were Linus and Tanya, Dave and Joy, Sue and Angie, and Stu and Josh.

The partners sat together, on the same side of the table.

In Summary

Key Idea

- Inductive and deductive reasoning are useful in problem solving.

Need to Know

- Inductive reasoning involves solving a simpler problem, observing patterns, and drawing a logical conclusion from your observations to solve the original problem.
- Deductive reasoning involves using known facts or assumptions to develop an argument, which is then used to draw a logical conclusion and solve the problem.

HOMEWORK...

**p. 48: #1 - 13
(OMIT #5, 8, 10, 11)**

Mr. Svarc's Missing \$ Problem...REALLY???

Two men were selling Atlantic Salmon Flies: one man sold 3 flies per dollar and the other man sold 2 flies per dollar.

One day they were both away so they each left 30 flies with a friend. To simplify the reckoning, the friend decided to sell 5 flies for 2 dollars. They sold them all and took in 24 dollars.

When it came to dividing up the sales between the owners...a problem arose. The one who had 30 flies at 3 for a dollar wanted \$10. The other who had 30 flies at 2 for a dollar wanted \$15. In total this made \$25.

The friend only made \$24 which means that they are a dollar short.

WHAT HAPPENED TO THE MISSING DOLLAR???

WARM UP PROBLEM: Need 4 gallons using only a 3 and 5 gallon jugs???



SOLUTIONS...

Step 1. Fill 5 gallon jug

Step 2. Pour 5 gallon jug into 3 gallon jug, leaving 2 remaining gallons in 5 gallon jug.

Step 3. Empty 3 gallon jug.

Step 4. Pour 2 gallons from 5 gallon jug into 3 gallon jug, leaving 1 gallon of empty space.

Step 5. Refill 5 gallon jug.

Step 6. Pour water from 5 gallon jug into 3 gallon jug, which already has 2 gallons in it, and only 1 gallon of empty space, leaving exactly 4 gallons in the 5 gallon jug.

One Hard

James

there is an alternate way to solve this:

1. fill the 3 gallon jug
2. pour that 3 gallons into the 5 gallon jug
3. refill the 3 gallon jug
4. fill the 5 gallon jug to the top, leaving 1 gallon in the 3 gallon jug
5. empty the 5 gallon jug
6. pour the 1 gallon from the 3 gallon jug into the 5 gallon jug
7. refill the 3 gallon jug
8. pour that 3 gallons into the 5 gallon jug which already has 1 gallon in it for a total of 4 gallons.

Attachments

1s6e1 finalt.mp4