1.6 Reasoning to Solve Problems

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?

person	1	2	3	4	5	6	7	8	9	10	11	12	13
unique handshakes	13	12	11	10	9	8	7	6	5	4	3	2	1

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people.	2	3	4	5	.....	14
handshakes	1	3	6	10		91

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EXAMPLE 2 Using reasoning to solve a problem

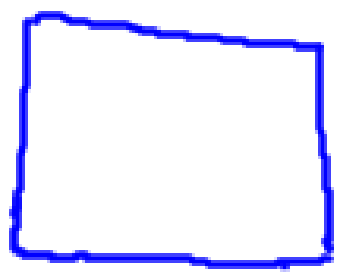
Sue signed up for games at her school's fun night. Seven other people were assigned to her group, making up four pairs of partners. The other members of her group were Dave, Angie, Josh, Tanya, Joy, Stu, and Linus. When the games started, Dave and his partner were to the left of Stu. Across from Dave 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.

* sketches are helpful.

Tanya/Linus

Dave
Joy



Sue
angie

Josh/
Stu

Angie
Joy
~~Linus~~

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1. Explain which type of reasoning is demonstrated by each statement.

a) Over the past 12 years, a tree has produced plums every other year. Last year, the tree did not produce plums. Therefore, the tree will produce plums this year. ID

b) Mammals have hair. Dogs are mammals. Therefore, dogs have hair. DD

c) Every Thursday, a train arrives at 2:30 p.m. Today is Thursday, so the train will arrive at 2:30 p.m. ID

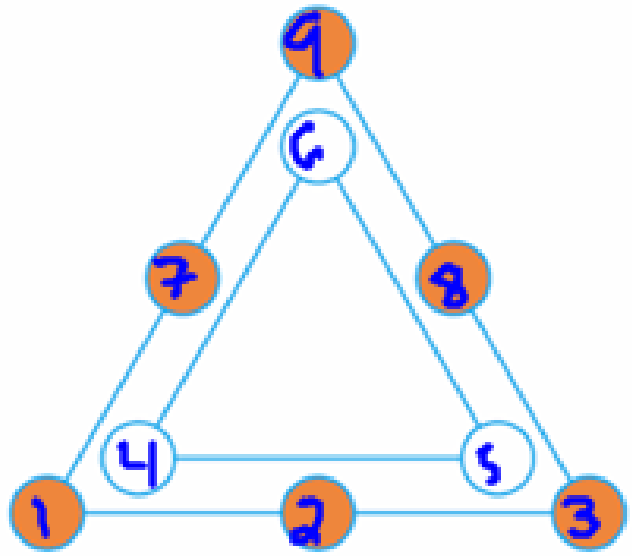
d) Every even number has a factor of 2. 24 is an even number. Therefore, 24 has a factor of 2. DD

e) For the pattern 3, 12, 21, 30, 39, the next term is 48. ID

ID - examples ... not proven.

DD = can be proven.

2. Copy this diagram. Place the digits 1 through 9 in the circles so that the sum of the numbers on the outside triangle is double the sum of the numbers on the inside triangle. Explain whether more than one solution is possible.



total: $1+2+3+4+5+6+7+8+9 = 45$

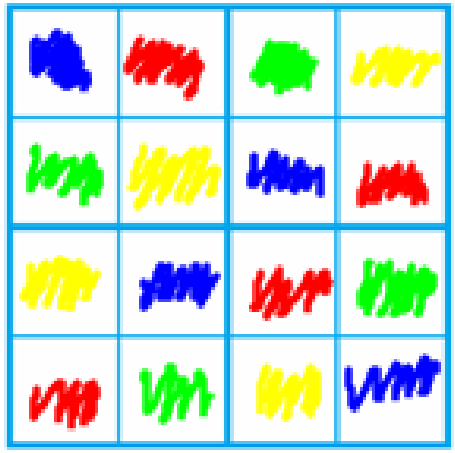
inside x

outside $2x$

$3x = 45 \quad x = 15$

5. a) Choose four different colours. Fill in the cells in a copy of this chart, so that each row and column has four different colours and each quadrant also has four different colours.

b) Compare your strategy with a classmate's strategy. How are your strategies the same? How are they different?



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3-10, 15, 16, 19, 20