

1.4 Proving Conjectures: Deductive Reasoning

Curricular Competencies

I can use play, inquiry and problem solving to gain understanding

I can explain and justify math ideas and decisions

I can apply flexible and strategic approaches to problems

Recall: Inductive Reasoning: _____

Deductive Reasoning _____

Ex. Make a deduction in each of the following cases.

- a. Paul lives in Medicine Hat. Medicine Hat is in Alberta.

- b. Every animal has a heart. All dogs are animals.

- c. The sum of any two consecutive whole numbers is an odd number. The whole numbers 11 and 12 are consecutive.

- d. The diagonals of a parallelogram bisect each other. $PQRS$ is a parallelogram.

- e. The diagonals of a rhombus intersect at right angles. $KLMN$ is a rhombus.

Proof: _____

We can use _____ reasoning to PROVE a statement is true.

Remember: We can use _____ reasoning to make conjectures and find _____ to support our conjecture. We may be able to find a _____ to prove our conjecture is _____ but we can NEVER prove a conjecture is _____.

Ex 2: Example 2: Jon discovered a pattern when adding integers:

$$\begin{aligned}1 + 2 + 3 + 4 + 5 &= 15 \\ (-15) + (-14) + (-13) + (-12) + (-11) &= -65 \\ (-3) + (-2) + (-1) + 0 + 1 &= -5\end{aligned}$$

He claims that whenever you add five consecutive integers, the sum is always 5 times the median of the numbers. Prove Jon's conjecture using an algebraic method.

Ex 3: Prove that the sum of any two odd numbers is an even number.

Ex 5: The following is an example of a number trick. Use inductive reasoning and three trials to determine the answer each time.

Choose a number. Double it. Add 5. Add your original number. Add 7. Divide by 3. Subtract your original number.

	1	2	3
Original Number			
Double			
Add 5			
Add Original #			
Add 7			
Divide by 3			
Subtract Original #			

Prove deductively what the answer should be each time.

A two-column proof is used in mathematics to prove a statement is true. One of the columns contains _____ that are known to be true and the other column contains _____ describing why the corresponding statement is true. (refer to p 29 ex 4)

Practice: pg 31 #1, 2, 4, 5, 7, 8, 10, 15