

1.1 Making Conjectures: Inductive Reasoning

Curricular Competencies:

I can explore, analyze and apply mathematical ideas

I can explain and justify math ideas and decisions

I can reflect on math thinking

Conjecture: A testable expression that's based on evidence,
but is not yet proven.

Inductive Reasoning: drawing conclusions by observing patterns and
identifying properties of specific examples.

Conjectures can be tested and those that appear to be valid allow us to continue
patterns extending beyond given data.

Ex: Study the following data about precipitation in Vancouver.

Precipitation in Vancouver (mm)												
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
2003	150.5	27.1	133.7	139.8	49.3	12.8	19.8	4.1	40.2	248.2	167.4	113.2
2004	249.6	45.8	132.8	90.2	68.6	49.6	43.6	28.6	53.6	155.4	136.6	160.8
2005	283.6	57.0	92.4	70.0	42.8	54.4	25.2	4.8	39.4	57.8	350.8	146.0
2006	181.4	116.0	214.8	76.2	37.0	80.0	53.0	8.4	73.6	155.2	116.2	210.6
2007	137.6	68.6	75.2	62.2	43.2	43.0	15.8	75.8	30.6	99.6	177.0	197.2

Use inductive reasoning to make some conjectures about precipitation in Vancouver.

Drastic change b/w Sept → Oct.
Big decrease From Jan → Feb

What mathematical calculations could you use to help support your conjecture? _____

Use averages (mean) for months. Graph data.

Ex: Make a conjecture on the product of two odd integers.

$$\begin{array}{cccc} 7 \times 1 & 7 \times 3 & 5 \times -3 & 3 \times 9 \\ 7 & 21 & -15 & 27 \end{array}$$

* All are whole number (or integers)

* All are odd.

Inductive Reasoning does not allow you to prove a conjecture to be true.
Continuing a pattern is a common form of inductive reasoning.

Ex. 1, 3, 7, ...

Conjecture #1: add 2, add 4, add 6 (adding consecutive #s) (13)

Conjecture #2: List of primes

(11) (13)

Conjecture #3: previous term $2x+1$

(15)

Conjecture #4: Add increasing power of 2

$2^1, 2^2, 2^3, 2^4$
 $2, 4, 8, 16, \dots$

Ex: Make a conjecture about the difference between consecutive perfect squares.

Subtraction

1, 4, 9, 16, 25, 36, 49, 64...

$$4 - 1 = 3$$

$$9 - 4 = 5$$

$$16 - 9 = 7$$

$$25 - 16 = 9$$

All consecutive odd #'s.

Ex: Study Example #4 on pages 10 and 11.

What conjecture did Marc make about the shape that is created by joining the midpoints of adjacent sides in any quadrilateral?

It will create a parallelogram

What mathematical processes did Marc use to support his conjecture?

Used protractor + ruler

What was Tracey's conjecture?

It forms a rhombus.

Whose conjecture is better? Explain.

Marc's $\rightarrow$ more data (mid + $\geq$) room for human error.

Tracey's $\rightarrow$ Used computer, could have had more variety in quadrilateral.

Are they both correct? Explain.

Both ...