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 is based on evidence but is not yet proven

Inductive Reasoning: drawing a conclusion by observing patterns and identifying properties in 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.

Precipitation increases dramatically between Sept - Oct. Jan -> Feb decreases a lot. Lower during summer months.

What mathematical calculations could you use to help support your conjecture? Graph the data to compare, find the average precipitation for winter/summer

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

5×7 $\quad$ 11×13 $\quad$ -3×-11 $\quad$ -23×3

35 $\quad$ 143 $\quad$ 33 $\quad$ -69

The product of two odd integers is always odd.

Inductive Reasoning does not allow you to prove a conjecture to be true.

Continuing a pattern is a common form of inductive reasoning. next number

Ex. 1, 3, 7, ...

Conjecture #1: add 2, add 4, add 6, adding consecutive even numbers — 13

Conjecture #2: a list of prime numbers — 11, 13

Conjecture #3: previous term x2 + 1 — 15

Conjecture #4: add two previous terms and the last one again. — 17

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

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

$4-1=3$
$9-4=5$
$16-9=7$
$25-16=9$

The difference between consecutive perfect squares is odd

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?

drew a quadrilateral, measured it out with ruler, and with a protractor

What was Tracey's conjecture?

it forms a rhombus

Whose conjecture is better? Explain.

Marc's used more work, Traceys could be more accurate Tracey's are labelled, they are both valid but are only based one example

Are they both correct? Explain.

Practice: pg 12 # 1 – 3, 7 – 9, ~~14~~, 16