

Patterns and Inductive Reasoning

Objectives

- 1 Use inductive reasoning to find the next terms of a pattern

Inductive Reasoning

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Inductive Reasoning is reasoning that is based on some pattern observed.

Example 1

Look for a pattern. What are the next 2 terms in each sequence?

(a) 3, 9, 27, 81, ...

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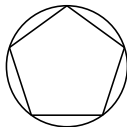
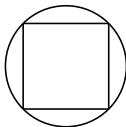
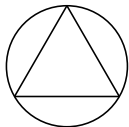
$$81(3) = 243$$

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The next two terms are 243 and 729.

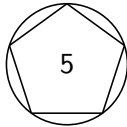
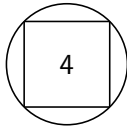
Example 1

(b)



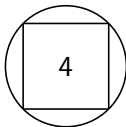
Example 1

(b)



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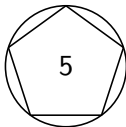
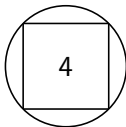
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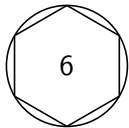
Each has a circle and number of sides increases by 1 each time.

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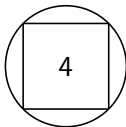


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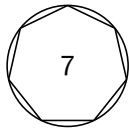
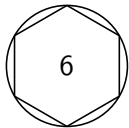


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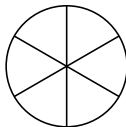
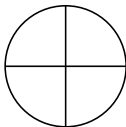
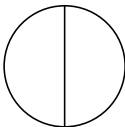
Conjectures

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A **conjecture** is a conclusion you reach based on inductive reasoning.

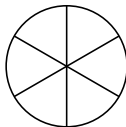
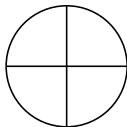
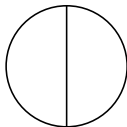
Example 2

Look at the circles. What conjecture can you make about the number of regions n diameters form?



Example 2

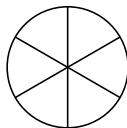
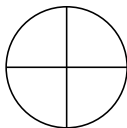
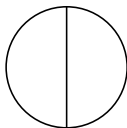
Look at the circles. What conjecture can you make about the number of regions 20 diameters form?



Num diam	1	2	3	...	20
Num regions	2	4	6	...	

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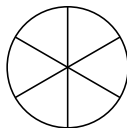
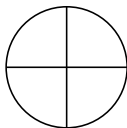
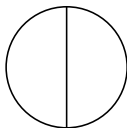


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Num regions	2	4	6	...	

$$\text{Num regions} = 2 \times \text{num diameters}$$

Example 2

Look at the circles. What conjecture can you make about the number of regions 20 diameters form?



Num diam	1	2	3	...	20
Num regions	2	4	6	...	40

$$\text{Num regions} = 2 \times \text{num diameters}$$

Example 3

What conjecture can you make about the sum of the first 30 even numbers?