## 1.2  Exploring the Validity of Conjectures
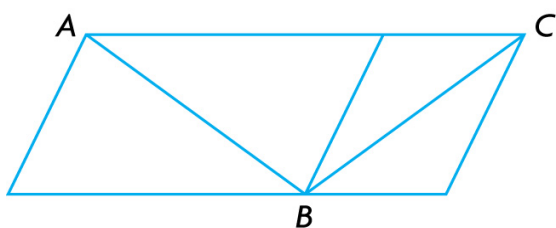
**GOAL**

Determine whether a conjecture is valid.

### EXPLORE the Math

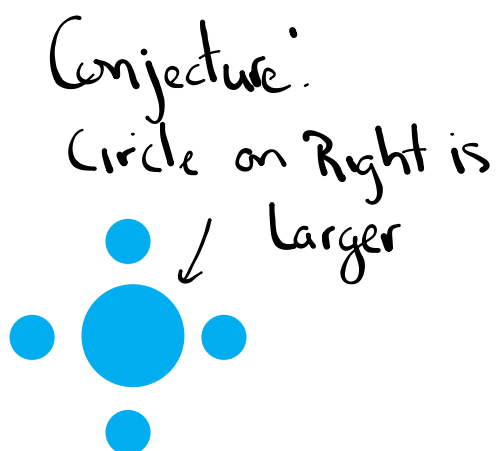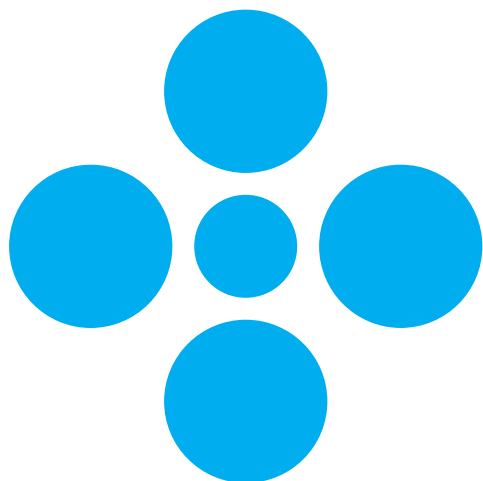Your brain can be deceived.

*Conjecture:*
*AB is longer than BC*

Make a conjecture about diagonal *AB* and diagonal *BC*.

? How can you check the validity of your conjecture?

## EXPLORE the Math

Your brain can be deceived.
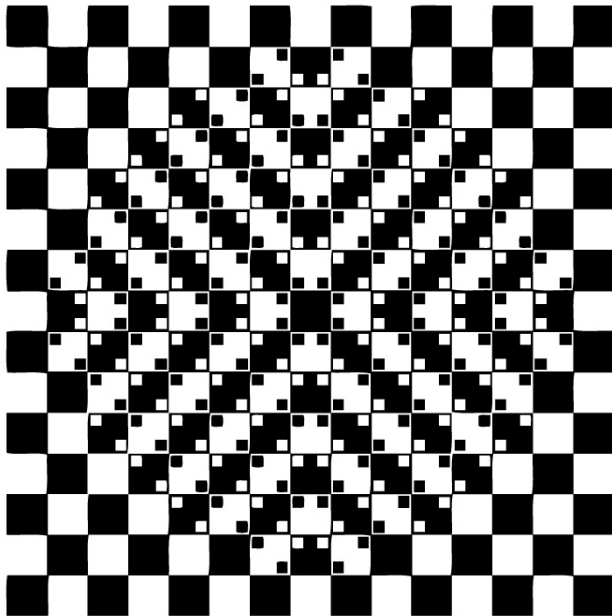
Conjecture:
Circle on Right is
Larger

Make a conjecture about the circles in the centre.

❓ How can you check the validity of your conjecture?
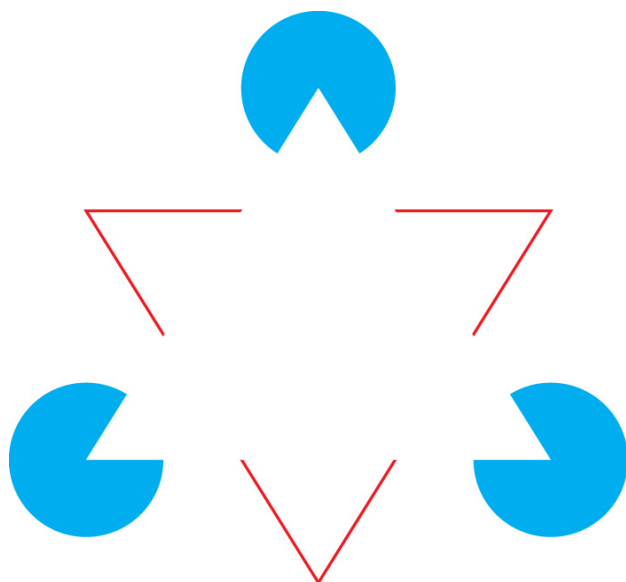
# EXPLORE the Math

Your brain can be deceived.



Make a conjecture about the lines.

❓ How can you check the validity of your conjecture?

Conjecture.

The lines are curved

## EXPLORE *the Math*

Your brain can be deceived.

Conjecture:
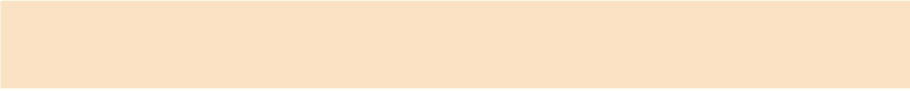# of Triangles
7, 2, 8

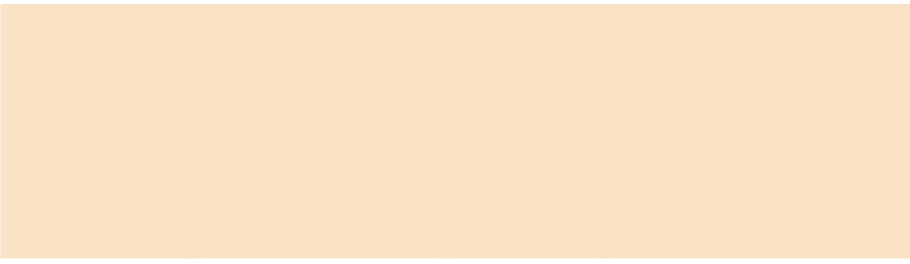Make a conjecture about the number of triangles.

❓ How can you check the validity of your conjecture?
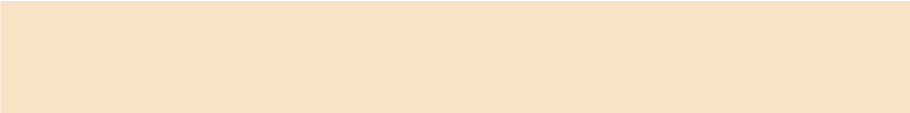
## Reflecting

**A.**   Describe the steps you took to verify your conjectures.

**B.**   After collecting evidence, did you decide to revise either of your conjectures? Explain.

**C.**   Can you be certain that the evidence you collect leads to a correct conjecture? Explain.

### Answers

**A.**

**B.**

**C.**

**In Summary**

**Key Idea**

- Some conjectures initially seem to be valid, but are shown not to be valid after more evidence is gathered.

**Need to Know**

- The best we can say about a conjecture reached through inductive reasoning is that there is evidence either to support or deny it.
- A conjecture may be revised, based on new evidence.

# **Assignment:   page 17**

# **Questions:  1, 2, 3**

SOLUTIONS => 1.2) Exploring the Validity of Conjectures.

1. Make a conjecture about the dimensions of the two tabletops. How can you determine if your conjecture is valid?

1cm      2.5cm

2.5cm              1 cm

Conjecture

The dimensions of the tabletop are the same

✳ You can determine the validity of this conjecture by using a ruler to check the measurements.

2. Examine the number pattern. Make a conjecture about this pattern. What steps can you take to determine if your conjecture is valid?

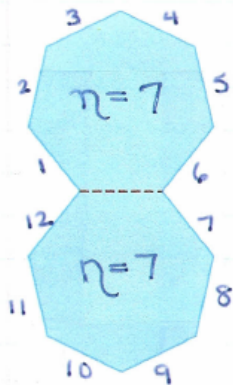**Pattern:**

$1^2 = 1$
$11^2 = 121$
$111^2 = 12321$
$1111^2 = 1234321$

**Conjecture:**

This pattern will continue until 12345678987654321 and after that it will change.

* To determine if this conjecture is valid, you would have to use a spreadsheet. (Calculator does not have enough space).

3. If two congruent regular heptagons are positioned so that they share a side, a dodecagon (12-sided polygon) is formed If two congruent regular hexagons are positioned so that they share a side, a decagon is formed. If two congruent regular pentagons are positioned so that they share a side, an octagon is formed. Make a conjecture about positioning two congruent regular quadrilaterals so that they share a side. Determine whether your conjecture is valid. Record your evidence.
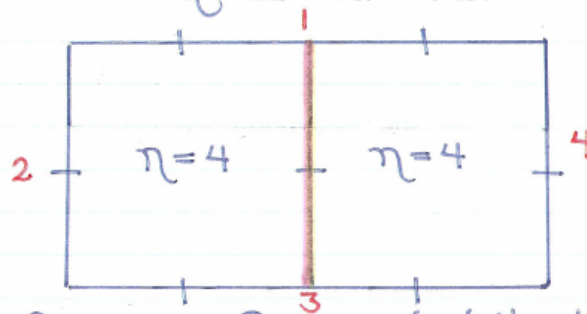
$n = 7$

$n = 7$

$\Rightarrow 2n - 2$
$= 2(7) - 2$
$= 14 - 2$
$= 12 \text{ sides}$

Conjecture ( According to the above pattern )

When two regular congruent polygons are positioned so that they share a common side, the resulting polygon will have $2n - 2$ sides, where $n = $ # of sides in one polygon.

This is invalid if you join two quadrilateral:

$n = 4$          $n = 4$

$\hookrightarrow 2n - 2$
$= 2(4) - 2$
$= 8 - 2$
$= 6$

Since $6 \neq 4$, this conjecture does not hold true.