

Check Your Understanding 5.1

Name: _____

Period: _____

Date: _____

Basic	Intermediate	Advanced
Classification and Definitions → Organizing the family		
<i>Basic</i> 1. Name every quadrilateral type that must have: (a) <i>Four right angles</i> (b) <i>Four congruent sides</i> (c) <i>Exactly one pair of parallel sides (non-parallelogram)</i> (d) <i>Diagonals that bisect each other</i> 2. Sketch a rhombus that is not a square. Mark the properties that make it a rhombus.	<i>Intermediate</i> 3. True or false? If false, give a counterexample. (a) <i>Every square is a rectangle.</i> (b) <i>Every rectangle is a square.</i> (c) <i>Every rhombus is a parallelogram.</i> (d) <i>Every parallelogram is a rhombus.</i> (e) <i>Every square is a kite.</i> (f) <i>Every trapezoid is a parallelogram.</i>	<i>Advanced</i> 4. A student says: 'Since a square has all the properties of a rectangle, anything I prove about rectangles must also be true for squares.' Is this correct? Explain using conditional logic. 5. A different student says: 'I proved that rhombuses have perpendicular diagonals. That means parallelograms do too, since rhombuses are parallelograms.' What is the error? Draw a Venn diagram to support your answer. 6. Write a conditional from the hierarchy whose converse is also true. Write one whose converse is false. Explain the difference.
Algebra Spiral Simplify	<i>Algebra Spiral</i> Simplify each expression completely. (a) $5x^2 + 3x - 2x^2 - 8x$ (b) $2(3a + 4) - 5(a - 1)$ (c) $(4y^2 - 3y + 7) - (y^2 + 2y - 5)$	

Answers — CYU 5.1**Classification and Definitions**

- 1a.** Rectangle, square.
1b. Rhombus, square.
1c. Trapezoid, isosceles trapezoid (excluding parallelograms under inclusive definition).
1d. Parallelogram, rectangle, rhombus, square.
2. Accept any rhombus with clearly unequal angles. All four sides must be marked equal. No right angle marks.
3a. True. **3b.** False — non-square rectangle. **3c.** True.
3d. False — rectangle with unequal sides. **3e.** True — two pairs of consecutive congruent sides. **3f.** False.
4. Correct. Square $\subset$ rectangle. Any property of all rectangles is automatically true for every square.
5. Direction reversed. Rhombus $\subset$ parallelogram. A property of the inner circle does not extend to the outer circle. Non-rhombus parallelograms are a counterexample.
6. Biconditional example: 'A parallelogram is a rectangle if and only if it has four right angles.' False-converse example: 'If a quadrilateral is a square, then it is a rectangle' — converse ('if rectangle then square') is false.

Algebra Spiral

- (a)** $3x^2 - 5x$
(b) $a + 13$
(c) $3y^2 - 5y + 12$