

Misconception/Error	Suggested Intervention
<p>1. Incorrect Classification of the Rectangle</p>	<ul style="list-style-type: none"> • Concrete: Measure Rectangles and Non-examples and develop a list of Rectangle Properties: <ul style="list-style-type: none"> ○ Congruent diagonals, ○ Perpendicular adjacent sides, ○ Parallel and Congruent opposite sides, etc. • Graphic Organizers for quadrilateral classifications • Connect the properties algebraically and through coordinate methods. • Create Property cards. • Spiral throughout the year, revisit often. • Classify in both directions -- from shape to properties and from properties to shape, also from physical representation to verbal description and vice-versa.
<p>2. Confusing the orientation of a quadrilateral with a defining characteristic</p>	<ul style="list-style-type: none"> • Give examples of squares in many different orientations -- it's still a square even if it is "standing" on a vertex, rather than its side. • Practice naming quadrilaterals which are in many different orientations on the graph. • Have students cut out quadrilaterals and see that they're the same even if you slant them.
<p>3. Errors Plotting Points</p>	<ul style="list-style-type: none"> • Kinesthetic Graphing • Elevator Trick (You have to go into the elevator (horizontal) before you can push the button to go up/down (vertical)) • Build the concept of a number line. • Use games like Battleship to engage learners.

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	<ul style="list-style-type: none"> • Make connections by using maps.
<p>4. Confusion about the word "height" for 3-D compared to 2-D figures</p>	<ul style="list-style-type: none"> • Have students label parts of 3-D models. • Make sure students can differentiate between which formulas are appropriate for 3-D and 2-D figures.
<p>5. Difficulty differentiating between area and surface area</p>	<ul style="list-style-type: none"> • Explore 2-D and 3-D models. • Explore "real world" examples of each concept. • Have students develop the formulas.
<p>6. Not understanding the word "similar"</p>	<ul style="list-style-type: none"> • Compare and contrast similar figures. • Use "real world" similar shapes to make it concrete for students (like an object and its shadow). • Make word wall for key vocabulary. • Use sentence frames: "Similar figures have _____ angles and _____ sides." • Vocabulary word sort • Model use of vocabulary graphic organizers - with definition, example, non-example.
<p>7. Difficulty conceptualizing a physical model from a written description</p>	<ul style="list-style-type: none"> • Have students create an actual model of the problem. • Have students use virtual or physical manipulatives to build the problem.
<p>8. Multiple approaches -- "If my approach looks different, I must be wrong."</p>	<ul style="list-style-type: none"> • Use more open-ended and free response questions. • Show multiple ways to solve problems. • Stress that mathematics relies on thought process, not just the answer.

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<p>9. Unsure of what it means to "justify"</p>	<ul style="list-style-type: none"> • Show students examples (like the student work samples) to see various "justifications" and discuss whether the examples adequately prove the given answer. • Explain that you're describing why your answer is correct. • Practice with error analysis problems
<p>10. Contextual Errors/Multi-part vs. Multiple Choice (Students may see the vertices A, B, C and D, and think it's a multiple choice question... or make a different contextual error)</p>	<ul style="list-style-type: none"> • Model reading directions thoroughly. • Model reading through an entire problem before you begin work. • Ask students to read the whole problem aloud and discuss what they know and what they are being asked to find -- describe the problem in their own words.
<p>11. Anxiety when there is more than one answer</p>	<ul style="list-style-type: none"> • Have students create questions with multiple answers. • Give multiple answers and have students come up with the question that leads to those answers. • Give students more exposure to questions with multiple answers -- create/find a bank of questions with multiple answers. • Scaffold up to more complex questions.
<p>12. Not persevering through the problem</p>	<ul style="list-style-type: none"> • Provide tangible and intangible incentives. • Begin with short problems and work up to longer problems. • Encourage group/team motivation, working peer pressure to the teacher's advantage.

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<p>13. Giving answers that aren't reasonable or don't make sense</p>	<ul style="list-style-type: none"> • Have students draw their solutions. • Have students turn to their neighbor and explain the solution. • As their last step in the problem-solving process, encourage students to ask "Does my answer make sense?" • Model for students to always go back and re-read the question after solving the problem to make sure they answered what was asked.