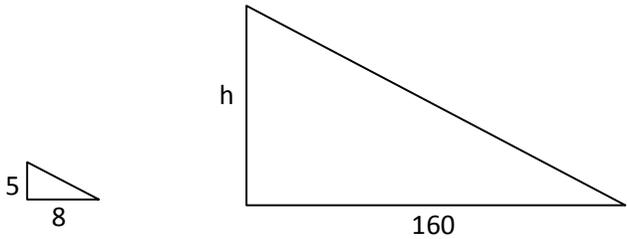


**eTech Math Mess Educator's Guide**

**Segment Title: The Shadow Knows**

<b>Alignment to Common Core Clusters</b>	<i>7.RP Students solve problems about scale drawings by relating corresponding lengths between the objects or by using the fact that relationships of lengths within an object are preserved in similar objects.</i>
<b>Critical Focus Area(s) and Rationale</b>	<p><i>7.RP.2 Recognize and represent proportional relationships between quantities.</i>  <i>7.RP.3 Use proportional relationships to solve multistep ratio problems.</i></p> <p>These activities allow students to reason with proportions. The activities are also connected to topics they will see later, such as Pythagorean Theorem, distance formulas, and tangent ratios. This problem, and others involving the two legs of a right triangle, prepare students to better understand the importance of proportions and ways to define similar figures in a coordinate plane, or in Euclidian Geometry.</p>
<b>Focus for Media Interaction / Suggested Classroom Activities</b>	<p>Tell students that they are about to see an animated clip about a boy, a Ferris Wheel, and a problem that he can solve by using what he knows about math! Remind students to look for facts that they think might be important. The video can always be replayed to help students focus on the important parts. After viewing, ask students to help Cory understand what his shadow was trying to tell him before the cloudy weather moved in and took his chance away. Allow students to pose ideas about how the shadow's information could help Cory to make his argument to his mother.</p>

<p><b>Suggested Extension Activities &amp; Resources</b></p>	<p>Look at other ways that two equivalent ratios could be set up to solve this problem. Can 5 be compared to h anytime 8 is compared to 160? How does the order of comparison matter? Does a sketch of the problem help students to 'see' the set-up more effectively? Give students some similar problems involving height and shadows. Ask them to create drawings and set up the relationships. Ask students if they think the same kinds of relationships hold true for any corresponding parts of similar figures?</p>
<p><b>Suggested Formative Assessment Probe</b></p>	<p>Tell students that you are looking for some similar problems that they can create for you. They can choose the numbers and they can choose the story behind them. Ask them to provide a complete solution to the problem, and that you will consider adding it to the next quiz. Use the opportunity to recognize some examples of strong work. Find a couple of examples of weaker work and, without identifying the students, talk about how the weaker problems could be stronger. Students need examples of strong and weak work to do reflection on their contributions. Remember that the purpose of formative assessment is to gather evidence of how students think about the mathematics in order that you can make choices about next steps in instruction. It is critical not to penalize students for incorrect answers in formative situations, but to use the information to better support their further learning.</p>
<p><b>One Proposed Solution to the Math Mess</b></p> 	<p>In sunlight, Cory's shadow will compare to his height exactly as the shadow of the Ferris Wheel compares to its height. In other words, if a 5 foot tall boy casts an 8 foot shadow, then a shadow 20 times as long would have to come from an object 20 times as tall as Cory. Mathematically the proportion will be two equivalent ratios: <math>\frac{5}{8} = \frac{h}{160}</math> Common Core encourages that the scale factor (in this case 20) is intentionally chosen to provide an easy-to-see and easy-to-understand connection between multiplication and "stretching", or dilation of similar figures.</p>