The Glass Wedge

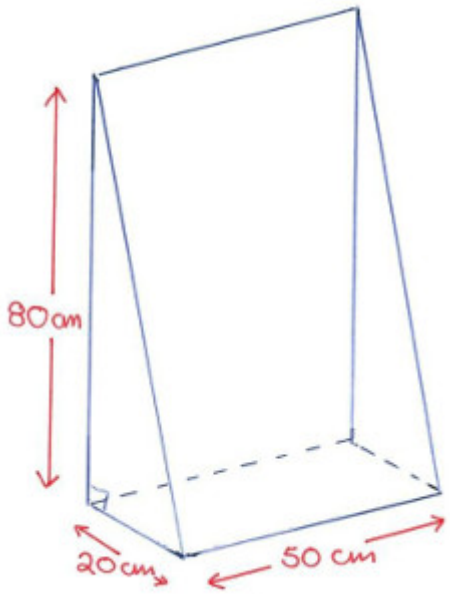
Annotation

Paula shows that she can use the scale factor of an enlargement to calculate volumes of a triangular prism under transformation.

Problem: The Glass Wedge

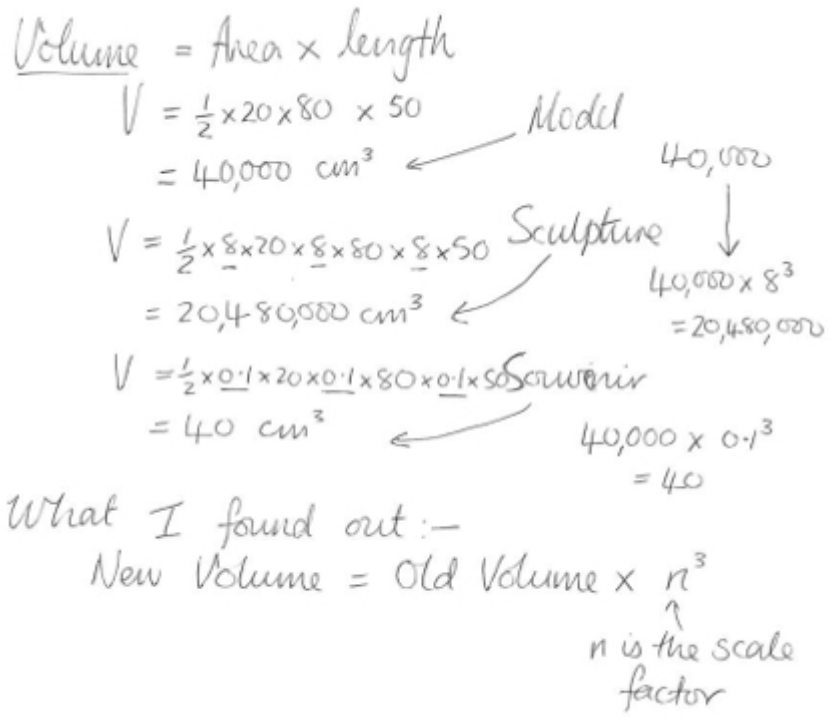
The teacher poses this problem:

An artist has been commissioned by a gallery to make a sculpture of a giant glass wedge. The gallery plans to sell small-scaled copies of the wedge as souvenirs. To produce the souvenirs, The artist builds a model that will be scaled up by a factor of n = 8 to produce the sculpture and scaled down by a factor of n = 0.1 to produce the souvenirs. Investigate the relationship between the volume of the wedge before and after scaling ***and*** *the scale factor for the dimensions.*



Artist's Model

Student Response



Teacher: Tell me about your investigation.

Paula: Well, I started out the long way, calculating volume by using the height and width of the triangle and then timesing the area of that by the length. So when I went to get a new volume for the sculpture or the souvenir, I changed the height, width and length by the scale factor each time.

Teacher: I notice that you've underlined parts of your calculation.

Paula: Yeah. When I was doing the long calculations, I saw that I had the scale factor in there three times. So it was like 8 x 8x 8 and I could just go 8^3 and get straight to the answer. The same thing worked for when the scale factor was 0.1. I could have just taken the volume of the model and timesed it by 0.1^3.

Teacher: Do you think this would always work.

Paula: Yeah. Cos when you are working out volume, its length x width x height. When you enlarge, you go n times length and n times width and n times height and then times all those together. So you might as well do the n's first and go n3 on its own and then times that by the original volume. It’s the same thing as doing it the long way, just a different order.