How Much Concrete?

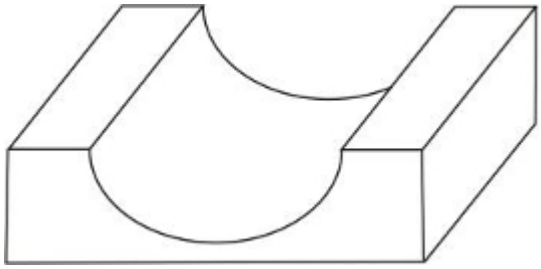
Annotation

Tracy is able to split a complex shape up into component parts, and to use the formula for area of a circle, in order to calculate its volume. She shows appropriate precision and correct use of units in her calculations and her final answer.

Problem: How Much Concrete?

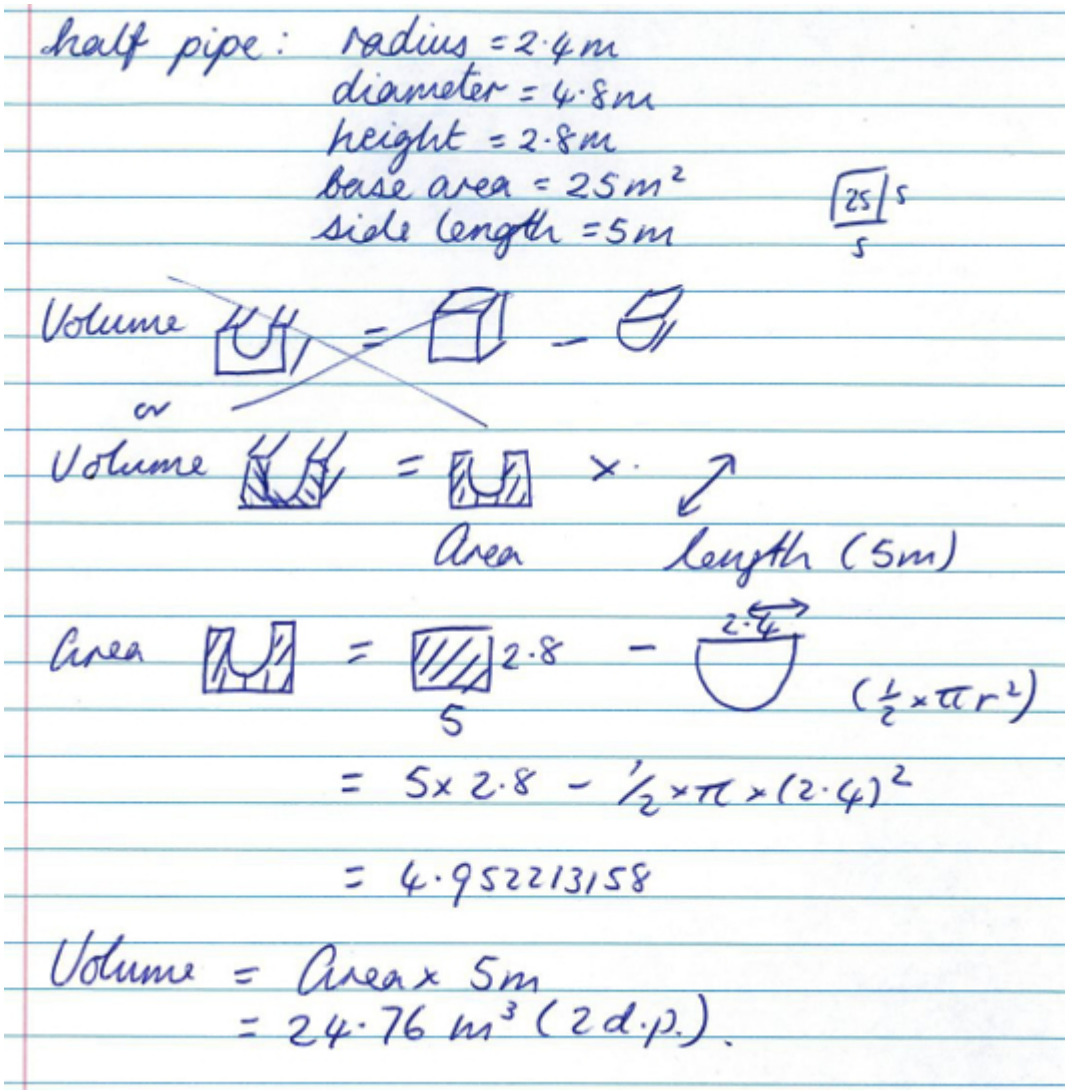
The teacher poses this problem:

Steve is designing a concrete half-pipe for skateboarding. The interior of his design is semicircular, with a radius of 2.4 m. The completed half-pipe will be 2.8 m high with a square base that has an area of 25 m2. The design is shown below.



Find the volume of concrete needed to build this half-pipe.

Student Response



Teacher: Talk me through how you went about solving this problem.

Tracy: I could see how it would fit neatly into a box. The base would be 25 and the height, 2.8 so that volume would be easy to get. But then I would have to take out the semicircle tube part and I thought that would be hard to work out, so I started again this time working out the area of the arch and timsing that by the length. Getting the length meant I had to use the 25 and see that it was the area of a square so the sides are 5 m long.

Teacher: I see that you've written 2 d.p. for your final answer.

Tracy: Yeah, because of pi, I got too many decimal places and they wouldn't be needed for building something in concrete, so I rounded to a sensible number.