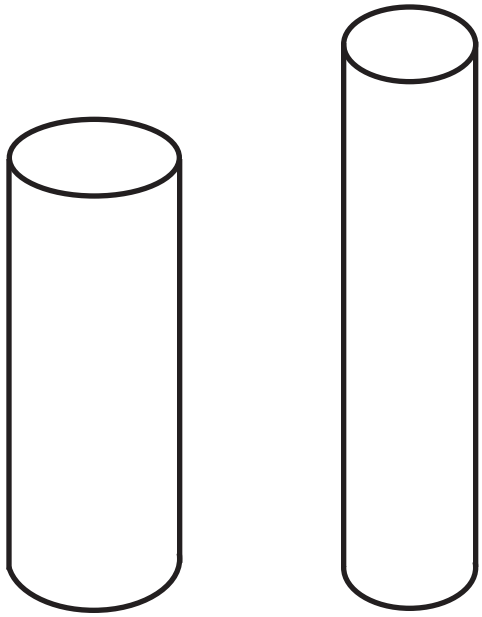
Cylinders with the Same Lateral Area

Take two identical sheets of paper, 11 inches by 8.5 inches. Form a tall cylinder with one of them by joining and pasting the two long edges of the rectangle. With the other sheet form a shorter cylinder by joining and pasting the shorter sides of the rectangle. The cylinders have only the lateral surface, with no base and no top. That is they look like a pipe rather than an unopened can.



Two cylinders formed with the same rectangles.

a) *Which of the two cylinders do you think will have the bigger volume?*
b) *Make an experiment and fill the long skinny cylinder first with packing material and then pouring the content into the other cylinder. Many people are surprised by the result. What have you observed?*

In what follows we will see how we can compute the volumes of the two cylinders to understand the result.

c) *What is the circumference of the base of the tall cylinder?*
d) *What is the height of the tall cylinder?*
e) *What is the circumference of the base of the short cylinder?*
f) *What is the height of the short cylinder?*
g) *Compute the radius of the base of each cylinder.*
h) *What is the area of the base of each cylinder? Remember that the area of a circle is given by* πr^2*, which is multiplying the radius by itself and then by 3.14.*

The volume of a cylinder can be computed by multiplying the area of the base times the height.

i) *What is the volume of each of the cylinders?*
j) *Are your results consistent with the result of the experiment?*