How Steep is Steep?

by Keith Olsen

How did a suburban street in Dunedin find its way into *The Guinness Book of Records*? Simple. Baldwin Street is the *steepest* street in the world.

It is so steep, it cannot be sealed with asphalt. The force of tyres climbing the slope would rip the soft asphalt off its base. Instead, the road is sealed with specially grooved concrete that helps the tyres grip the road.

Pedestrians use steps and handrails to help them up the slope, but in 1988, Iain Clark *roller skated* up Baldwin Street. And in 1993, a house was shifted onto a section at the very top of the street!

How steep is steep?

Every slope has a **gradient** – a measure of its steepness. To find the gradient, ask yourself, "How far must I travel horizontally to be one metre higher?"

5 metres

FOR SAFETY
REASONS:
SIGHTSEERS ARE
REQUESTED NOT
TO DRIVE UP
THIS STREET

For example, the street in the diagram has a gradient of 1 : 5. This means that to gain one metre of height, you must travel, horizontally, five metres.

But the steepest street in the world has a gradient of 1 : 2.9 – you would need to travel only 2.9 metres horizontally to be one metre higher. That's steep!

Calculating the gradient

How steep are the steps in your neighbourhood? Check out their gradient.

- First choose a unit of length. (Centimetres is probably best if you're measuring steps.)
- Measure the horizontal distance a step takes you.
- Measure the vertical distance a step raises you.
- Divide horizontal distance by height. This answer gives the second number in the gradient. The first number is always 1.

1 metre

25
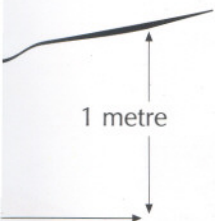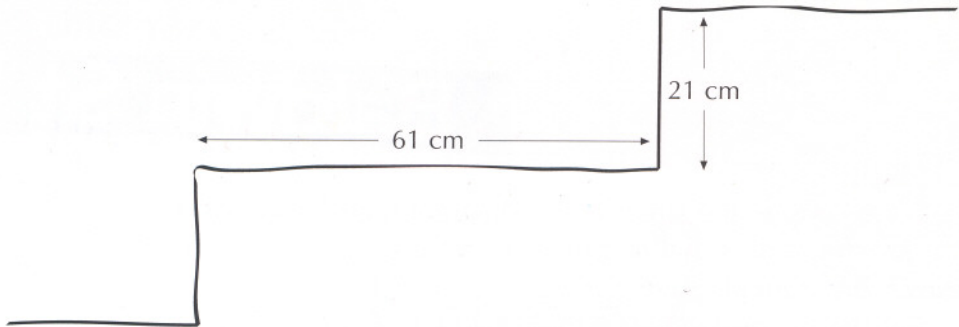
For example, taking the steps that run up beside Baldwin Street:
Horizontal distance = 61 cm
Height of step = 21 cm
61 ÷ 21 = 2.9 (or very close to it)
So the gradient is 1 : 2.9.

Finding the gradient of a smooth slope is a little harder. How could you use three stakes and a spirit level to find the gradient of a path or bank at school?