# Data sheet                    Shoe sizes

For a shoe to be comfortable, it needs to be slightly larger than the foot that goes in it, but if it is too large, the foot slides about inside the shoe. Traditionally, shoes are designed to be about 0.8 inches longer than the foot they are intended for.

The difference in length between one shoe size and the next is one 'barleycorn', which is one third of an inch. In many European countries shoes sizes differ in size by a 'Paris point', which is two-thirds of a centimetre.

## Calculating shoe sizes

Manufacturers use formulae for calculating shoe sizes. In the UK, a typical formula is

$$\text{male shoe size} = 3 \times (\text{foot length in inches} + 0.8) - 24.5$$

$$\text{female shoe size} = 3 \times (\text{foot length in inches} + 0.8) - 21.5$$

Example

Peter's foot length is 10.7 inches. His shoe size can be calculated:

$$\text{shoes size} = 3 \times (10.7 + 0.8) - 24.5$$
$$= 10$$

In Europe there is generally no separation of men's and women's sizes, and a typical formula is

$$\text{shoe size} = 1.5 \times (\text{foot length in cm} + 2)$$

## The shoe size that fits

In the UK, manufacturers only make shoes in a whole or half number sizes eg size 8, $8\frac{1}{2}$, 9 etc. In Europe they use only whole number sizes 35, 36, 37 etc. Someone in the UK whose shoe size is calculated to be, for example size 8.75, has to make a choice from what is available and choose, in this particular case, $8\frac{1}{2}$ or 9. What they choose may depend on other factors, apart from their foot length, such as design of shoe, width of their feet and prevailing fashion.

**1**

Jane and Rita both wear the same style of shoes.
Jane takes size 4 and Rita takes size 6.

What is the difference in the length of their shoes?

_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ inches

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**2**

Danielle has a foot length of 22cm.
According to the formula given in the data sheet, what is the European shoe size that she needs?

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**3**

Use the formula given on the data sheet to find the longest foot length that will fit a European shoe of size 39

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**4**

**(a)**   Stephan measures the length of his foot as 26.3cm.

What European sizes of shoe should he try on as a likely fit?

_ _ _ _ _  and  _ _ _ _ _

**(b)**   Mary's foot is 9¼ inches long.

What UK sizes of shoe (including half sizes) should she try on as a likely fit?

_ _ _ _ _  and  _ _ _ _ _