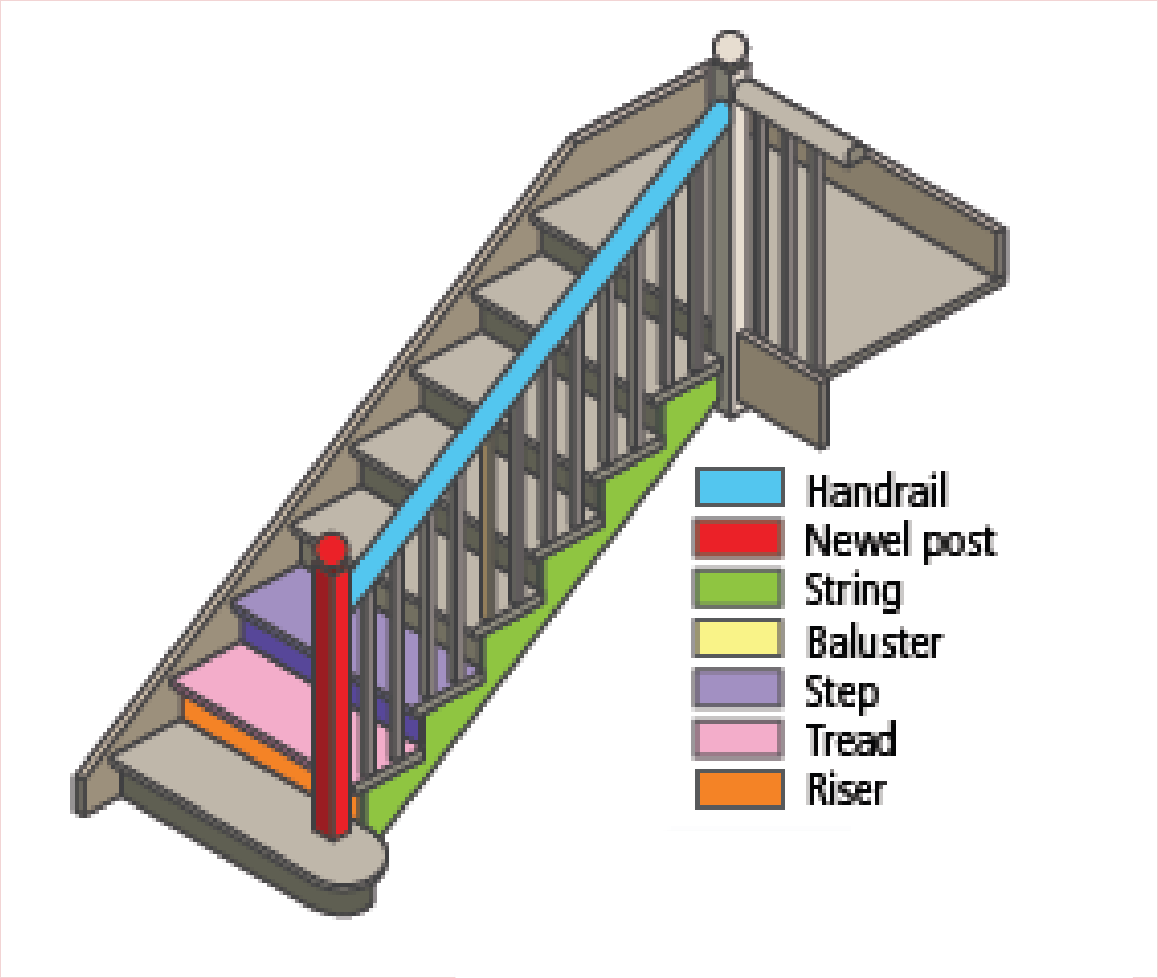
CHAPTER 14
STAIRS

Stairs

- Ergonomically sound
- Structurally sound and stable enough to take any loads placed on it
- Durable
- Easily navigable
- Aesthetically pleasing

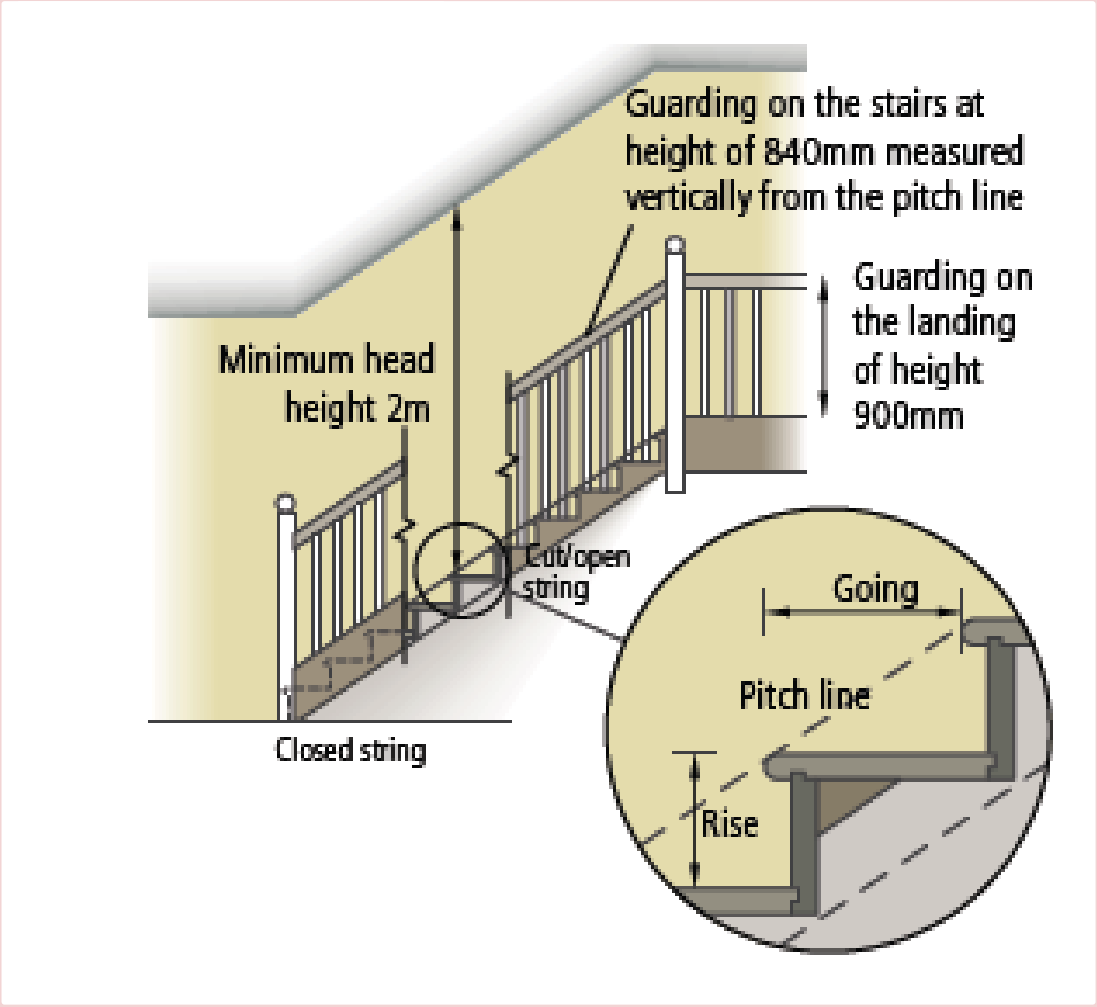
Stairs Terminology

- Handrail
- Newel post
- String
- Baluster
- Step
- Tread
- Riser
- Flight



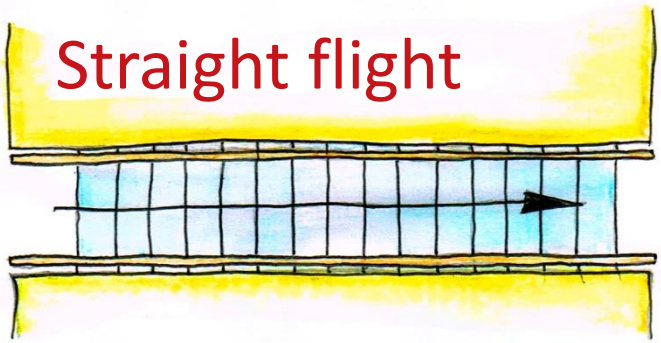
Stairs Terminology

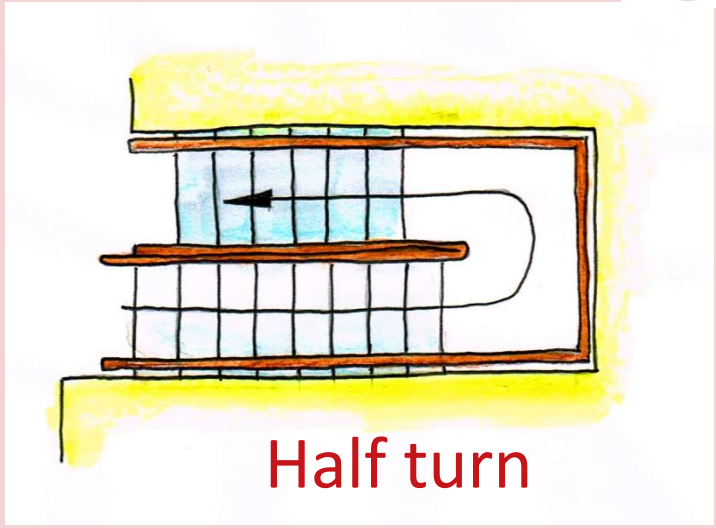
- Nosing
- Going
- Rise
- Pitch
- Guarding



Types of Staircase

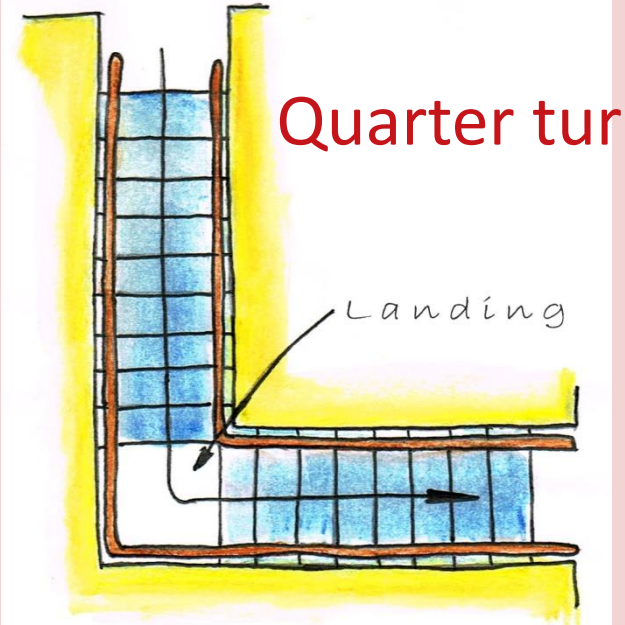
Straight flight



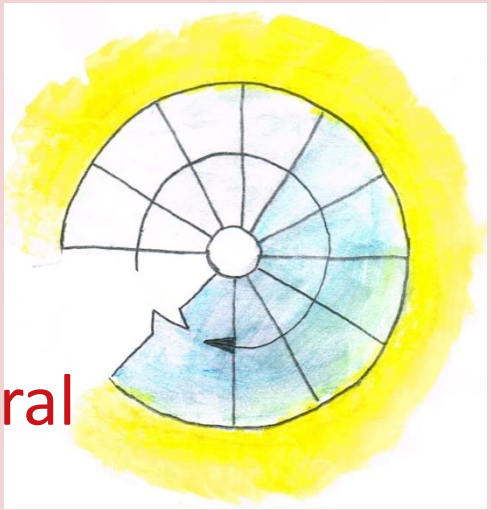


Half turn

Quarter turn



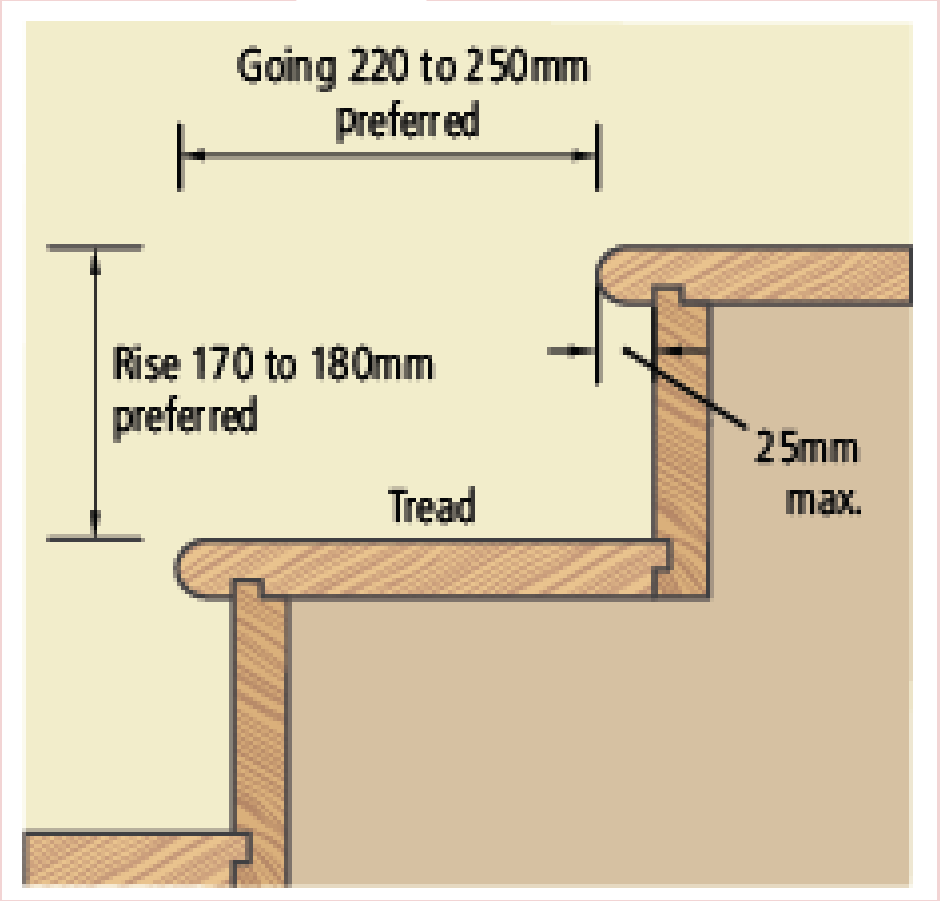
Spiral



Stair Safety

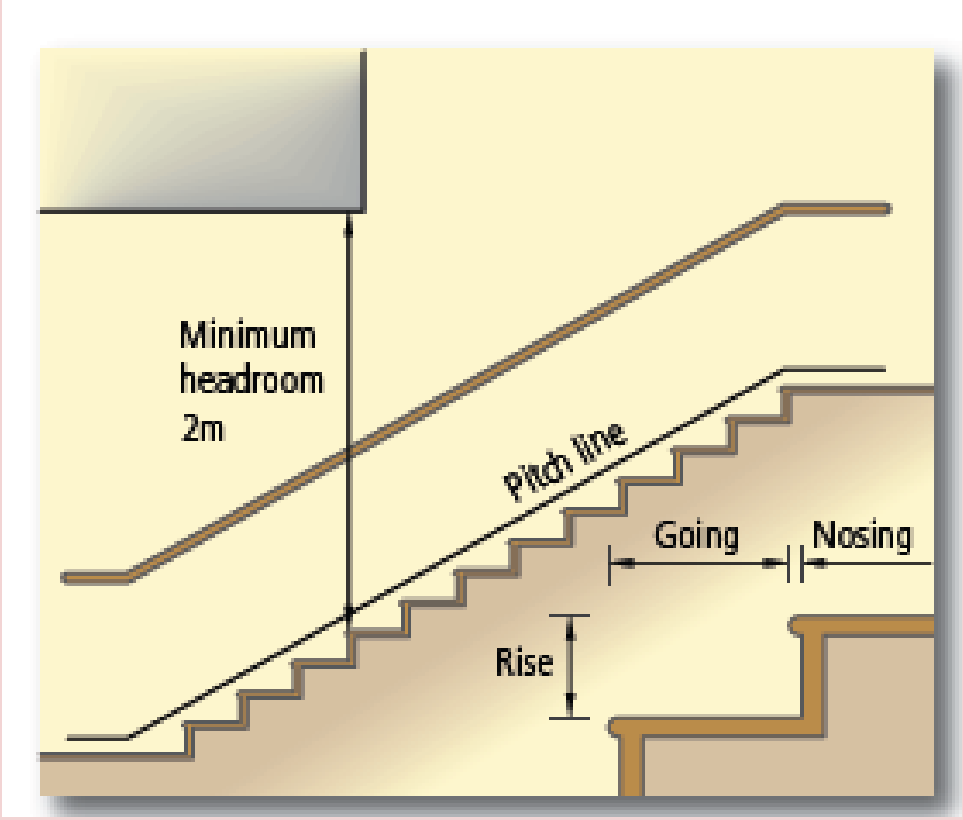
Twice the rise plus the going should equal between 550mm and 700mm

2R + G = 550–700mm



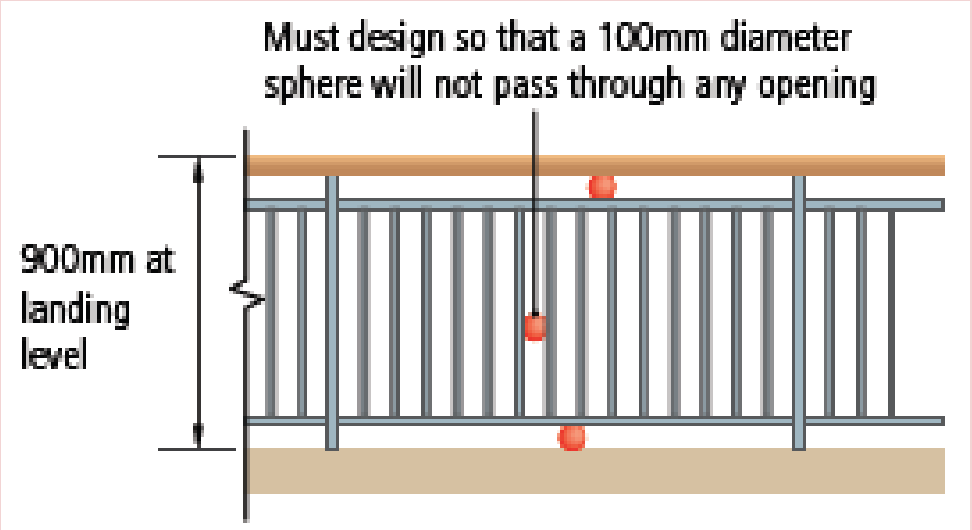
Stair Safety

- Max. rise = 220mm (optimal height 175mm)
- Min. going = 220mm (optimal depth 250)
- Headroom = 2m at least
- Max. pitch = 42° (optimal 35°)

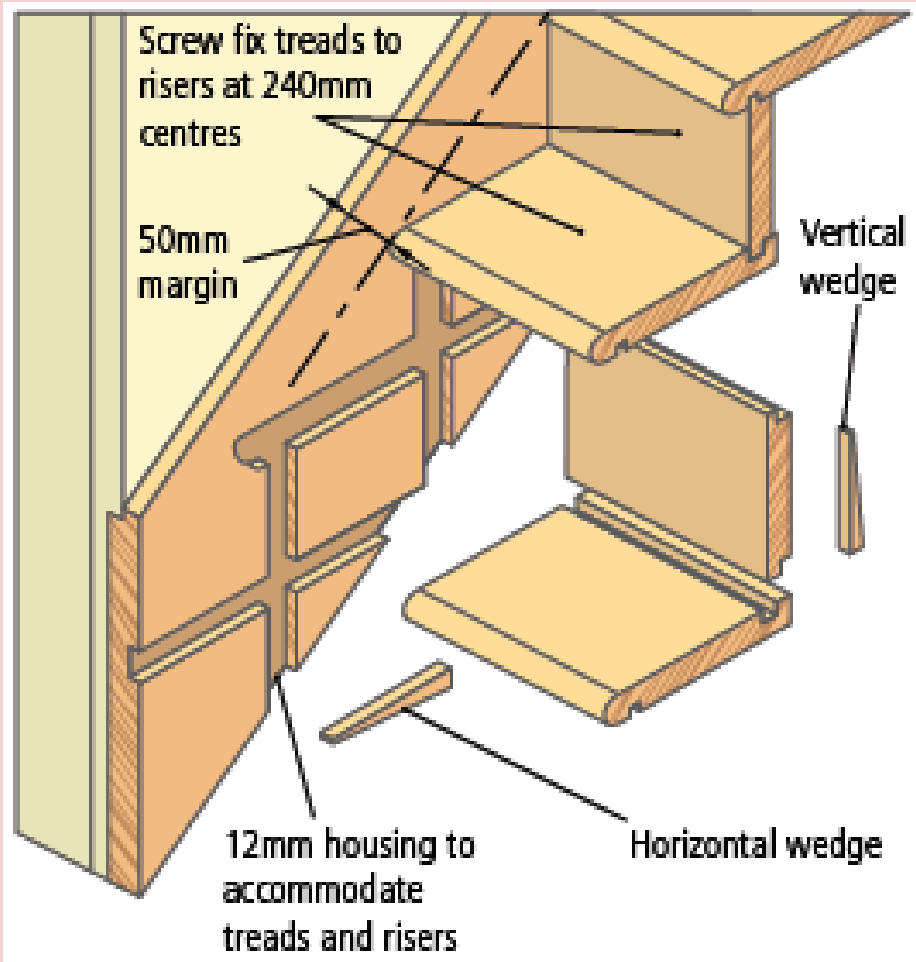


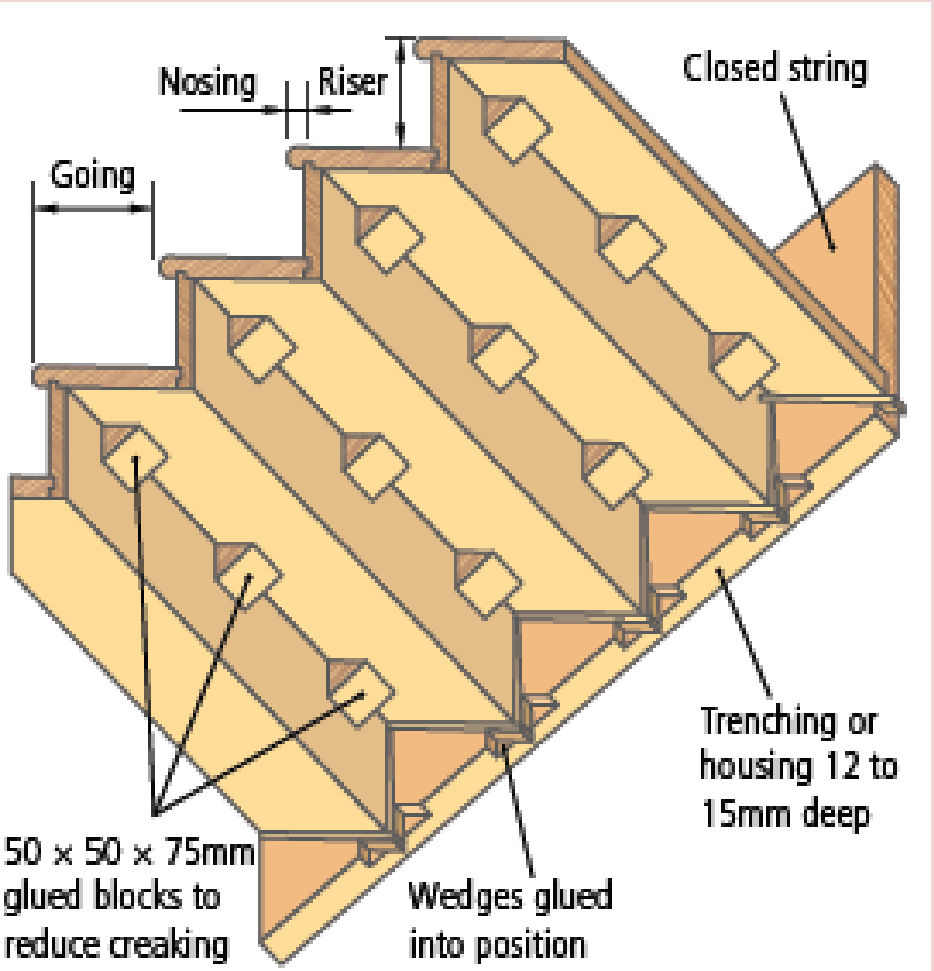
Stair Safety

- Handrail = 840-900mm above pitch line
- Handrail = 900mm at landing
- Balusters spaced no further than 100mm apart
- Max. 16 steps in a flight
- Min. stair width 800mm



Stair Construction





Sample Calculation 1

Two floors are 2700mm apart. Calculate the rise and going of a staircase from the lower floor to the upper floor that meets all building regulations.

Step 1

First we must find the number of steps that divides into the total rise. We start by dividing the total rise by the maximum number of steps (16):

$$\frac{2700}{16} = 168.75\text{mm}$$

Although 168.75mm meets the building regulations, it is too difficult to adhere to a measurement this precise in the construction of the stairs. So we will divide by 15 steps, as this is the next logical number.

$$\frac{2700}{15} = 180\text{mm}$$

Fifteen steps meets the requirements, and 180mm is a straightforward measurement to work with.

Step 2

Now that we have a rise we must calculate a going. The formula we will use for this part of the calculation is:

2R + G = 550–700mm

We use the optimum rise and see if our equation is satisfied.

2(180) + (optimal going) = 550–700mm
360 + 250 = 610mm

As 610mm falls within the average stride length (550–700mm) this is an acceptable set of dimensions:

Maximum rise = 220 (our rise = 180mm)
Minimum going = 220 (our going = 250mm)

Both of our calculations fall within the requirements and therefore 15 steps with a rise of 180mm and a going of 250mm are the recommended dimensions for this staircase.

Sample Calculation 2

Two floors are 2035mm apart. A stairs is to be constructed between the floors with a maximum overall going of 3300mm. Calculate a rise and going that will satisfy all building regulations and allow safe passage between the floors.

Step 1

Divide the total rise by the maximum number of steps to establish whether it will work.

Total rise/16	=	2035/16 = 127.1875mm. Not a round number, so try 15 steps.
Total rise/15	=	2035/15 = 135.6mm. Again not a round number, try 14 steps.
Total rise/14	=	2035/14 = 145.357mm. Try 13 steps.
Total rise/13	=	2035/13 = 156.538mm. Try 12 steps.
Total rise/12	=	2035/12 = 169.583mm. Try 11 steps.
Total rise/11	=	2035/11 = 185mm. This is a round number that fits the regulations (max. rise = 220mm).

Step 2

Check if this number of steps allows for the going to fit building regulations.

Total going = 3300mm, number of steps = 11. Going = 300mm.

2R + G = 550–700mm

2(185) + 300 = 670mm. These measurements fit the building regulations. Therefore a rise of 185mm and a going of 300mm will produce a stairs of 11 steps that spans an overall going of 3300mm and rises 2035mm between floors.