

ABDUL AND BELLA

Abdul is 10 and Bella is 12.

How old will Bella be when Abdul is 12?

Why is the answer not as obvious as it might seem?

The thing to realise is that Abdul and Bella probably do not share a birthday, so when Abdul is age n Bella will not always be age $n + 2$, as it will depend on whether or not she has had her birthday yet that year. Age problems are often used in mathematics lessons without taking account of this complication, and yet every child with a sibling knows about this!

Age rounds differently from other measurements, in that you are 10 years old until the day of your 11th birthday – there is no rounding up to 11 once you reach 10-and-a-half! So we can represent Abdul’s age by the red line segments in Figure 1.

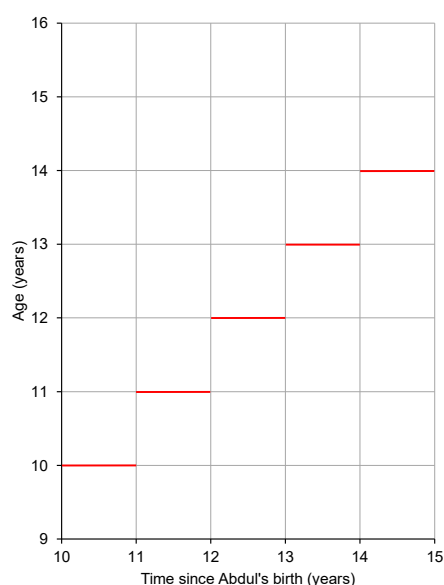


Figure 1

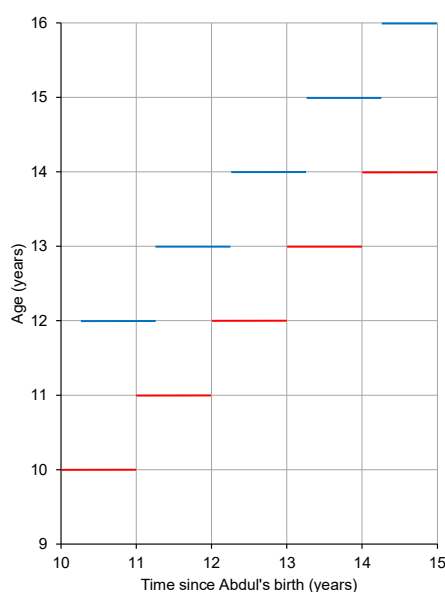


Figure 2

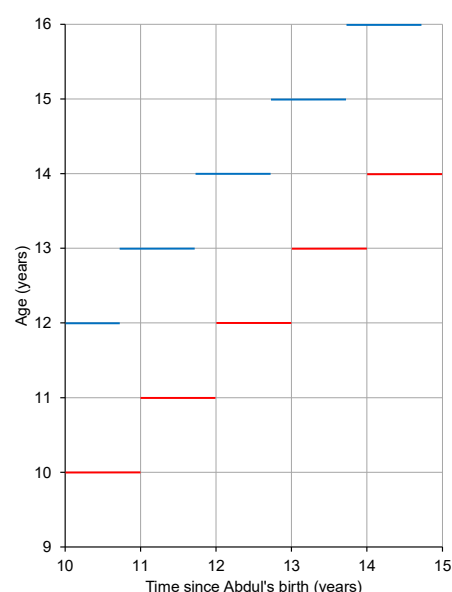


Figure 3

Red is Abdul, blue is Bella

Bella’s birthday is probably different from Abdul’s. In Figure 2, we suppose that Bella is a little bit *less* than 2 years older than Abdul, so she doesn’t reach age 12 until a little while *after* Abdul reaches age 10. In Figure 3, we suppose that Bella is a little bit *more* than 2 years older than Abdul, so she reaches age 12 a little while *before* Abdul reaches age 10.

Now we can use Figures 2 and 3 to answer the question. In Figure 2, during the time in which Abdul is 12, Bella will be 13 or 14, and in Figure 3, during this same time period in which Abdul is 12, Bella will be 14 or 15. So the answer is that Bella may be 13, 14 or 15. People often think that there might be two possible solutions, but rarely realise until they really think about it that there are actually three!

Another way to think about this, without having to draw graphs, is to realise that the minimum age difference is 1-and-a-bit years and the maximum age difference is just-less-than-3 years. So when Abdul is just 12, Bella must be at least 13. When Abdul is 12-nearly-13, Bella must be at least 13 and can be 15 (but not 16, which would be just *over* 3 years gap).