Arithmetic Series – Q2 [Practice/E] (17/6/21)

If I pay £50 into a bank account, then £60 a year later, followed by £70 the following year, and so on, increasing by £10 each year, how long will it take for the amount in the bank account to reach £1000?

Solution

Consider $\frac{n}{2}[(2(50)+10(n-1)] = 1000$

$\Rightarrow n(90+10n) = 2000$

$\Rightarrow n^2 + 9n - 200 = 0$

$\Rightarrow n = \frac{-9 \pm \sqrt{81+800}}{2} = 10.3 \ \ (\text{as } n > 0)$

So, at the start of the 11th year (after paying in the amount due then) there will be over £1000 in the account.