In 1749, Henry Pelham, the first English Chancellor of the Exchequer (the English equivalent of our Treasury Secretary) combined all of his government’s long term obligations. These consolidated obligations later became known as “consols”. They still trade in today’s securities markets, more than 250 years later.

British consols pay the owner a fixed amount of money each year forever. (Such investments are called *perpetuities*.)

(a) Compute the present value (in British pounds) of a British consol that pays 10 pounds per year, assuming that the first payment is one year from the date of purchase, that succeeding payments follow annually, and that the annual interest rate is 5% per year, by

1. computing the present value of the payment of 10 pounds received at the end of the $n$-th year; and then

2. summing up the present value of these payments to find the present value of the consol.

(b) Under the same assumptions as in part (a), what is the present value of the first thirty annual payments?

(c) Suppose that, instead of annual payments, the payments are made as a *continuous income stream* at a constant rate of 10 pounds per year. Assume the interest rate remains at 5% but is now continuously compounded. What then would be the present value of the consol?

(d) Do you notice anything surprising about the relation between the answers to part (a) and part (c)? Can you see how to better understand this relationship? If you had to make the choice between the methods of (a) and (c) when you made a purchase, which should you choose or would it matter?