

(4/4)

Example Joe Bloggs is repaying two loans. The 1st was a loan of £10,000 taken out exactly 5 yrs ago and is being paid back over a 10 yr period by annual payments in arrears. The ~~NER~~APR charged is 15%. The 2nd loan was for £5,000 taken out exactly a yr ago and is being paid back over a 5x year period by annual payments in arrears. The APR charged on this loan is 12%. There is no penalty for repaying the loans early, and Joe Bloggs takes out a ^{new} loan to repay the first two over 5 years, annual payments in arrears at 10%. Find the premium for his new loan.

Loan 1: $i = 0.15$, $v = \frac{1}{1.15}$, annual premium to be found from $P \neq 10000 = Pa_{\overline{10}|}$, $a_{\overline{10}|} = \frac{v(1-v^{10})}{1-v}$

$$P = 1992.52 \text{ (2dp)}$$

The amount outstanding after 5 yrs $Pa_{\overline{5}|} =$

$$P \cdot 1992.52 \times \frac{v(1-v^5)}{1-v} = 6679.24$$

Loan 2: $i = 0.12$, $v = \frac{1}{1.12}$ annual premium to be found from $5000 = Pa_{\overline{5}|}$ $\therefore P = \frac{5000}{a_{\overline{5}|}} = 1216.13$

The amount outstanding after 1 year $Pa_{\overline{4}|} =$

$$1216.13 \times \frac{v(1-v^4)}{1-v} = 4383.88$$

New loan: $i = 0.10$, $v = \frac{1}{1.1}$ annual premiums over 5 yrs to an the loan is for $\pounds 6679.24 + \pounds 4383.88 = \pounds 11,063.12$

Premium to be found from $11063.12 = Pa_{\overline{5}|}$

$$P = \frac{11063.12}{a_{\overline{5}|}} \text{ at } v = \frac{10}{11}$$

$$= 2918.42$$

Answer $\pounds 2918.42$