December 2005
Regulars

Series: solution

If you regularly deal with VAT, you'll have noticed that 17.5% = 10% + 5% + 2.5%. So you can easily calculate VAT by first taking 10%, then halving to get 5%, halving again to get 2.5%, and then adding up the three numbers. If the VAT rate were to increase in a way that sticks to this pattern, it would have to be increased by half of 2.5%, which is 1.25%. And if it gets increased again and again? Well, each time we halve the previous rate, so at the end of eternity the VAT rate will be

$$(1 + 1/2 + 1/4 + 1/8 + ...) \times 10\% = 20\%,$$

because the sum of the infinite geometric series in the brackets is 2.

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