

Citizenship and PSHE in Maths

VAT

Teachers' Notes

The KS4 citizenship programme of study states that all students should have opportunities to explore... the economy in relation to citizenship.

The KS4 PSHE programme of study (Economic wellbeing and financial capability) states that students should have opportunities to explore ... personal budgeting, wages, taxes, money management, credit, debt and a range of financial products and services ... and ... risk and reward, and how money can make money through savings, investment and trade.

The following task, outlined on the next page, should be completed by ALL students in year 10 (although set 4 students could attempt this in year 11 as the work involves reverse percentages). The activity contributes to the school's citizenship and PSHE delivery (as outlined above).

The task is self-explanatory and is described on the student sheets.

Opportunities for independent study

Students could research the rate of VAT levied in other countries.

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VAT (Value-added tax)

This tax is set by the Chancellor of the Exchequer and is currently 17.5%.

Most things that you buy include VAT (but books, children's clothes and food are currently exempt from VAT).

Example

A computer costs £350 + VAT. Work out the total cost of the computer including VAT.

Solution:

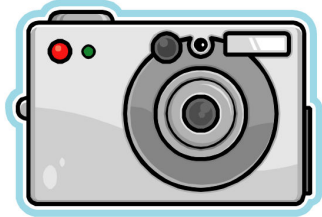
Either...

$$\begin{aligned}\text{VAT} &= 17.5\% \text{ of } 350 \\ &= 0.175 \times 350 \\ &= \text{£}61.25 \\ \text{Total} &= \text{£}350 + \text{£}61.25 \\ &= \text{£}411.25\end{aligned}$$

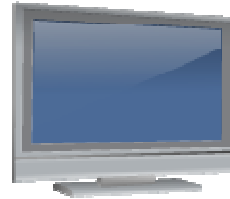
OR... use a multiplier

$$\begin{aligned}\text{Total} &= 1.175 \times 350.25 \\ &= \text{£}411.25\end{aligned}$$

➤ The prices given below do not include VAT. Find the total cost of these items with VAT included.



Digital Camera
£76.59 + VAT



Television
£386 + VAT



Chart CD
£7.31 + VAT



Small car
£7400 + VAT

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VAT (Value-added tax)

Reverse Percentages

VAT can be claimed back in some cases. For example schools do not have to pay VAT on purchases and businesses can claim back VAT on materials that they use in order to make other products.

So sometimes we need to know the cost of something before the VAT was added.

Example

A hotel charges £140 per room per night including VAT. What is the cost of a room excluding VAT?

Solution

Method 1:

Let the cost of a room excluding VAT be represented by 100%

Then the cost of a room including VAT would be represented by 117.5%.

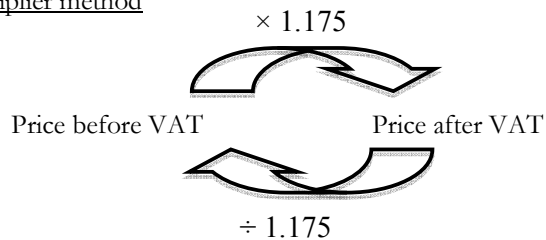
So $117.5\% = \text{£}140$

Therefore $1\% = \text{£}140 \div 117.5 = 1.1915$

So $100\% = 1.1915 \times 100 = \text{£}119.15$ (to nearest pence)

So.. a room costs £119.15 per night before VAT.

Method 2: Multiplier method



So the cost of the room is $140 \div 1.175 = \text{£}119.15$ (to nearest pence) before VAT.

➤ The prices below include VAT at 17.5%. Find the price of these items before VAT was added.



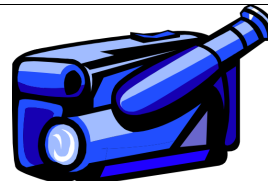
Microwave
£90 including VAT



Mobile phone
£65.99 including VAT



Printer
£148.50 including VAT



DVD recorder
£499.99 before VAT