

REVERSE PERCENTAGES (OR FINDING THE ORIGINAL QUANTITY)

- Business people often claim back the VAT that they pay for office equipment. They therefore need to work out the cost of an item before VAT was included.
- In this example, the **original** quantity is **unknown** and must be **calculated**.

EXAMPLE

The price of a DVD is reduced by 35% in the sales. It now costs £91. What was the original price?

ANSWER

This is a reduction, so the sale price is $100\% - 35\% = 65\%$ of the pre-sale price.

$$65\% = \frac{65}{100} = 0.65$$

$$0.65 \times (\text{original price}) = £91$$

$$\therefore (\text{original price}) = 91 \div 0.65 = £140.$$

EXAMPLE

A local business man bought a PC for £1200 including VAT at 17.5%. How much was the PC before VAT ?

ANSWER

This is an increase so the cost after VAT is $100\% + 17.5\% = 117.5\%$.

$$117.5\% = 1.175$$

$$1.175 \times (\text{original cost}) = £1200$$

$$\therefore (\text{original cost}) = 1200 \div 1.175 = £1021.28.$$

EXAMPLE

Harry has just got a 5% pay rise and now earns £21200 per annum. What did he earn before the pay rise ?

ANSWER

This is an increase so his salary after the increase is $100\% + 5\% = 105\%$.

$$105\% = 1.05$$

$$1.05 \times (\text{original salary}) = £21200$$

$$\therefore (\text{original salary}) = 21200 \div 1.05 = £20190.48$$

EXERCISE

1. After a pay rise of 5%, Peter's weekly pay is £126. How much did he earn before the rise?
2. The following table shows the weekly wage of a number of employees after percentage increases as shown. Find the original weekly wage of each employee:

| | Name | % increase in pay | Weekly wage after increase |
|----|----------------|--------------------------|-----------------------------------|
| a. | George Edwards | 10% | £245 |
| b. | Anna Rees | 8% | £342 |
| c. | John Regus | 15% | £499 |
| d. | Sian Lloyd | 7% | £256.87 |
| e. | Rhian Evans | 4% | £421.56 |

3. The purchase price of a camera is £563.45. If this includes VAT at 17.5%, find the price before VAT was added.
4. Mr. Jones bought a computing equipment for his new office. The final price was £3453.23. If this included VAT at 17.5%, what was the price before VAT was added?
5. Mrs. George has her heating bill. It came to £244.63 including VAT at 5%. What was her bill before VAT was included?