

Calculating the original value

Year 8 About 70 minutes Calculator allowed 52 marks



Hints online, answers free with an account:
mathswariz.uk/worksheets/ks3-year-8-calculating-the-original-value/

Date _____

A Do Now

Quick questions to start.

- A1** Needed today [1 mark] Write down the multiplier for a decrease of 35%.
 Answer
- A2** Needed today [1 mark] Work out $336 \div 1.2$.
 Answer

- A3** Last lesson [1 mark] A price goes up from £50 to £58. Work out the percentage increase.
 Answer
- A4** Year 7 [1 mark] Work out 30% of 70.
 Answer

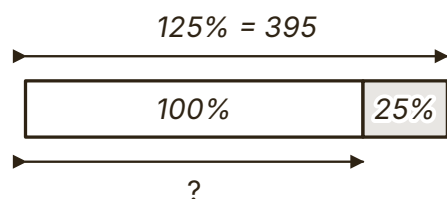
B Example, then your turn

Year 8

original $\times$ multiplier = new, so original = new $\div$ multiplier. Your teacher works through each example with you. Then try the one beside it.

EXAMPLE 1

The number of members of a club went up by 25%. There are now 395 members. How many members were there before the increase?

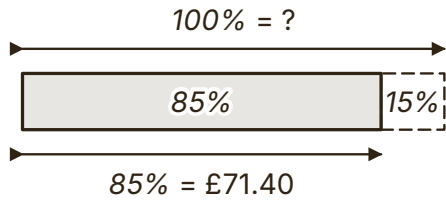


Hint The 395 is 125% of the old number, so the multiplier is 1.25.

- B1** After a 35% increase, a bus fare is £2.97. Work out the fare before the increase. [2 marks]
 Answer

EXAMPLE 2

In a sale, the price of a coat is reduced by 15%. The sale price is £71.40. Work out the price before the sale.



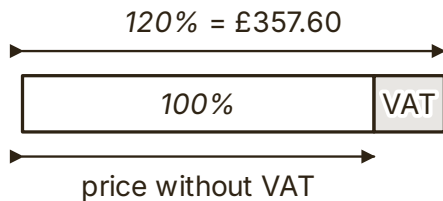
Hint The sale price is $100\% - 15\% = 85\%$ of the old price, so the multiplier is 0.85.

- B2** After a 22% decrease, the number of fish in a pond is 312. How many fish were there before the decrease? [2 marks]

Answer

EXAMPLE 3

A plumber's bill is £357.60. This includes VAT at 20%. Work out the bill without VAT.



Hint VAT is added on to the price, so the bill is 120% of the price without VAT.

- B3** A phone costs £214.80, including VAT at 20%. Work out the price of the phone without VAT. [2 marks]

Answer

EXAMPLE 4

VAT on a gas bill is 5%. A gas bill is £176.40, including VAT. How much of the bill is VAT?

Hint Find the bill without VAT first. The VAT is the difference.

- B4** A laptop costs £622.80, including VAT at 20%. How much of the price is VAT? [2 marks]

Answer

EXAMPLE 5

After a 30% price rise a toy costs £78. Sam says, "30% of 78 is 23.40, so the old price was $78 - 23.40 = £54.60$." Show that Sam is wrong.

Hint The 30% is a percentage of the OLD price, not of £78. Test Sam's answer.

- B5** After a 10% fall in value, a car is worth £7200. Jo says, "The value before was $7200 \times 1.1 = £7920$." Explain why Jo is wrong, and work out the value before the fall. [3 marks]

Answer Value before £

C Practice

Year 8

- C1** After an increase of 2.5%, the rent on a shop is £922.50 a month. Work out the rent before the increase. [2 marks]

Answer

- C2** A school has 840 students. This is 5% more than last year. (i) How many students did it have last year? (ii) The number goes up by 5% again next year. How many students will there be? [2 marks]

Answer (i) (ii)

- C3** Concert tickets are reduced by 30%. Each ticket now costs £24.50. Mia buys 4 tickets. How much does she save because of the reduction? [3 marks]

Answer

- C4** In another country a bike costs 440 euros without VAT and 541.20 euros with VAT. Work out the rate of VAT in that country. [2 marks]

Answer

- C5** After a 140% increase, the population of a town is 52 800. Work out the population before the increase. [2 marks]

Answer

- C6** A packet of rice says "20% extra free". The packet now holds 576 g. How much rice is in a normal packet? [2 marks]

Answer

- D1** Ravi says, "In a 10% off sale a jacket costs £63. So the price before the sale was $63 + 6.30 = £69.30$." [3 marks]

Ravi is wrong. Explain why, and work out the price before the sale.

Answer Price before the sale £

- D2** The table shows three prices. Each price includes VAT at 20%.

- (a) Work out the price of the kettle without VAT. [2 marks]

Item	Price including VAT
Kettle	£38.40
Fridge	£449.40
Sofa	£1158.00

Answer

- (b) Lena buys all three items. How much VAT does she pay altogether? [3 marks]

Answer

Total for D2: 5 marks

- D3** A theatre increases the price of a ticket by 20% to £18. The number of tickets it sells each night falls by 20% to 440. Does the theatre take more or less money each night than before? By how much? You must show your working. [4 marks]

Answer by £

- D4** Two shops sell the same television. In Shop A the price is £540 after a 10% discount. In Shop B the price is £572 after a 12% discount. Which shop had the higher price before its discount? By how much? [4 marks]

Answer Shop ... by £

D5 Between 2001 and 2021 the population of a town rose by 18% to 70 800.

(a) Work out the population in 2001.

[2 marks]

Answer

(b) Between 1981 and 2001 the population rose by 25%. Work out the population in 1981. [2 marks]

Answer

Total for D5: 4 marks

E Extension

Stretch

No route is given. The hints are at the end of the sheet. Use one at a time.

E1 If a price is increased by a certain percentage, it becomes £84. If the same price is decreased by the same percentage, it becomes £56. Find the price and the percentage. [4 marks]

Answer Price £ Percentage%

Extension hints

Cover these with paper. Uncover one at a time.

E1 **Hint 1** The increase and the decrease are the same amount of money, because they are the same percentage of the same price.

Hint 2 The price is halfway between £56 and £84.

Hint 3 The price is £70. The change is £14, and $14 \div 70 = 0.2$.

How did it go?

Colour one circle on each line: not yet, nearly, yes.

I can find the original value after a percentage increase or decrease. ☐ ☐ ☐

I can work out a price without VAT, and how much of a price is VAT. ☐ ☐ ☐

I can explain why taking the percentage off the new value is wrong. ☐ ☐ ☐

I can compare original values found from different changes. ☐ ☐ ☐