Reverse Percentage Problems

a. In a sale with 25% off a coat is priced at £48.

What was the original price before the sale?

Original Price × 0.75 = £48

so £48 ÷ 0.75 = Original Price

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b. After losing 15% of his weight on a diet, a man weighed 68 kg. What was his original weight?

Original weight × 0.85 = 68 kg

so 68 kg ÷ 0.85 = original weight

68 kg ÷ 0.85 = 80 kg

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c. A television is priced at £288 inclusive of 20% VAT

What is the price exclusive of VAT?

Ex VAT price × 1.20 = £288

so £288 ÷ 1.20 = Ex VAT price

£288 ÷ 1.20 = £240

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d. After a 5% pay rise John had an hourly rate of pay of £6.72. What was his previous hourly rate of pay?

Previous rate × 1.05 = £6.72

so £6.72 ÷ 1.05 = Previous rate

£6.72 ÷ 1.05 = £6.40

Exercise

11. A workforce is reduced by 5% to 437. What was the previous size of the workforce?
12. Including 20% VAT a television costs £420. What is the ex-VAT price?
13. 442 soldiers completed their training course. If 15% dropped out, how many began the course?
14. A coat is priced at £42 in a sale with 25% off. What was the price of the coat before the sale?
15. After a 15% price rise a cycle cost £184. What was the price before the price rise?

ADVANCED USE OF PERCENTAGES

EXERCISE

10. ~~Decrease £33 by 23%~~

~~100% − 23% = 77%~~

~~Find 77% of £33~~

~~£33 × 0.77 = £25.41~~

11. Workforce reduced by 5% to 437

Original × 0.95 = 437

so 437 ÷ 0.95 = original

437 ÷ 0.95 = 460

Original workforce = 460

12. Ex-VAT price + 20% = £420

Ex-VAT price × 1.20 = £420

so £420 ÷ 1.20 = Ex-VAT Price

£420 ÷ 120 = £350

Ex-VAT price = £350

13. Original − 15% = 442

Original × 0.85 = 442

so 442 ÷ 0.85 = original

442 ÷ 0.85 = 520

520 soldiers started course

14. Original − 25% = £42

Original × 0.75 = £42

so £42 ÷ 0.75 = original

£42 ÷ 0.75 = £56

Coat was originally £56

15. Original + 15% = £184

Original × 1.15 = £184

so £184 ÷ 1.15 = £160

Cycle was originally £160

Reverse Percentages Without a calculator

Ex A TV is £240 including VAT at 20%

Find ex-VAT

£240 = 120% of original

£240 ÷ 6 — £40 = 20%

£40 × 5 — £200 = 100%

A coat in a sale with 25% off costs £48. What was pre-sale price

£48 = 75%

£48 ÷ 3 — £16 = 25%

£16 × 4 — £64 = 100%

Exam Question

Adam buys a computer

20% VAT is added to price

Adam pays £900

Work out price before VAT was added

£900 = 120%

£900 ÷ 6 — £150 = 20%

£150 × 5 — £750 = 100%
