Year 9 – Reasoning with Number
Percentages and Money

Essential knowledge

- Calculate percentage increase and decrease
- Calculate percentage change
- Calculate reverse percentages
- Calculate interest and solve money problems

Key Vocabulary

Percent: parts per 100 – written using the % symbol.
Fraction: a fraction represents how many parts of a whole value you have.
Equivalent: of equal value.
Reduce: to make smaller in value.
Growth: to increase/ to grow.
Integer: whole number, can be positive, negative or zero.
Multiplier: the number you are multiplying by.
Profit: the income take away any expenses/ costs.

Prior learning links

Year 7- Fractions and percentages of amounts
Year 8- Fractions and Percentages

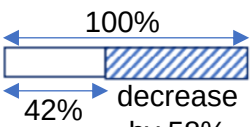
FDP Equivalence

Percentage - 100% = a whole = 100 hundredths

70% → $\frac{70}{100}$ → 70 hundredths = 7 tenths= 0.7

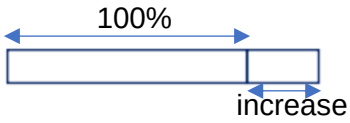
Percentage Increase and Decrease

Decrease



1.00 – 0.58 = 0.42

Increase



1.00 + 0.12 = 1.12

Percentage Change

I bought a phone for £200.
A year later sold it for £125

All values of change compare to the **original value**

Change- £200 - £125 = £75

Percentage loss

$\frac{75}{200}$ × 100 = **37.5%**

$$\frac{\text{difference in values}}{\text{original value}} \times 100$$

Compound Interest

I invest £300 into a savings account at 5% compound interest for 2 years…

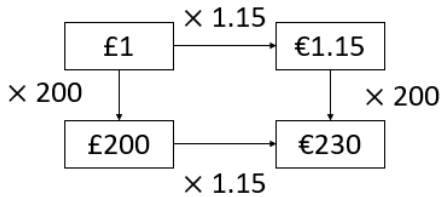
capital → 300 × 1.05^2 = £330.75 ← years

multiplier

Exchange Rates

Exchange rates use ratio and proportion to convert between currencies

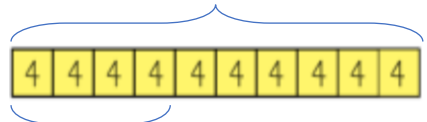
The exchange rate here is £1 = €1.15



Reverse Percentages

40% of my number is 16.
What am I thinking of?

Original number (100%)



16 (40%)

40% = 16
10% = 4
100% = 40

Try to scale down to 10% or 1% and then scale back up to 100%

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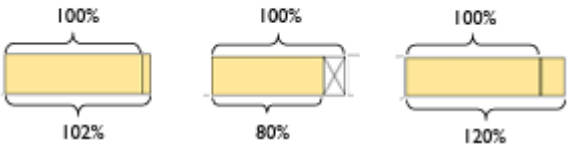
Prior learning links

Draw lines to match the bar model to the correct percentage increase/decrease and multiplier.



20% decrease

2% increase

20% increase

1.02

1.2

0.8

Key Vocabulary

Define the words:
Percent-
Fraction-
Equivalent-
Reduce-
Integer-
Multiplier-
Profit-

FDP Equivalence

Express as a decimal
a) 3⁄4 b) 72% c) 125%

Express as a fraction
a) 0.25 b) 65% c) 0.4

Express as a percentage
a) 3⁄4 b) 0.125 c) 1.5

Reverse Percentages

a) In a sale, a shop reduces all its prices by 10%. On the last day of the sale, the shop reduces the sale prices by 20% On the last day of the sale, a mobile phone costs £432 How much was the mobile phone before the sale?

b) Evie is given a 22% pay rise. Her new salary is £21,960 What was Evie's salary before the pay rise?

c) Trevor is a car salesman. He bought a car for £5000 Currently he is holding a sale with 35% off the price of all cars. Trevor wants to sell the car so that he makes a 10% profit on the price he paid. How much should Trevor advertise the car for?

Percentage Increase and Decrease

a) Increase 120 by 5%

b) Increase £1.50 by 20%

c) Decrease £66 by 10%

d) Decrease £2.20 by 5%

Alex increases 30 g by 20%
She then decreases her answer by 20%
Dora says she will have less than her original amount of 30 g
Alex disagrees. Who is correct?
Justify your answer.

Percentage Change

a) In January, a puppy weighed 4kg. Three months later, the same puppy weighed 5kg. What was the percentage increase in the puppy's weight?

b) Daisy bought a car for £20,000. She sold the car for £15,000. Work out the percentage loss.

Mo buys a rare comic for £120 and sells it again for £170

Compare these methods to work out his percentage profit.

Method 1

$170 - 120 = 50$

$\frac{50}{120} = 0.41666 \approx 42\%$

Method 2

$\frac{170}{120} = 1.41666 \approx 142\%$

$142\% - 100\% = 42\%$