Unit 2 – Working with Percentages – Knowledge Organiser

Objectives

- Convert between fractions, percentages and decimals
- Express/write one value as a percentage of another value
- Find percentages of amounts using non-calculator methods
- Increase or decrease a number by a given percentage using non-calculator methods
- Find the original amount, given the result of a percentage change (reverse percentages)
- Use calculator methods (percentage multipliers) to find percentage increases and decreases

Key Facts/Examples

Fractions	Decimals	Percentages
$\frac{1}{2}$	0.5	50%
$\frac{1}{3}$	$0.\dot{3}$	$33.\dot{3}\%$
$\frac{2}{3}$	$0.\dot{6}$	$66.\dot{6}\%$
$\frac{1}{4}$	0.25	25%
$\frac{3}{4}$	0.75	75%
$\frac{1}{5}$	0.2	20%
$\frac{1}{10}$	0.1	10%

Multipliers:

Original amount x multiplier = new value

Percentages of Amounts: Find 21% of £500

Using simple percentages

100% is the original amount.
10% = £50
1% = £5
21% of **£500 = 2 x £50 + £5**
= £105

Using percentages multipliers

$21\% = \frac{21}{100} = 0.21$

21% of £500 = 0.21 x 500
= £105

Percentage Increase: Increase £50 by 10%

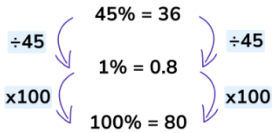
Add on percentage:	Multiplier:
10% of £50 = £5 £50 + £5 = £55	£50 x 1.1 = £55

Percentage Decrease: Decrease £50 by 10%

Subtract percentage:	Multiplier:
10% of £50 = £5 £50 - £5 = £45	£50 x 0.9 = £45

Reverse Percentages:

45% of a number is 36. Find the original number.



A jacket costs £102 after a discount of 15%. What is the original price of the jacket?

100% – 15% = 85% = 0.85

Original Price ? → x 0.85 → New Price £102
Original Price ? ← ÷ 0.85 ← New Price £102

Original price
= £102 ÷ 0.85 = £120

The price of a ticket costs £30 inclusive of 12% tax. What is the pre-tax cost of the ticket?

100% + 12% = 112% = 1.12

Original Price ? → x 1.12 → New Price £30
Original Price ? ← ÷ 1.12 ← New Price £30

Original price
= £30 ÷ 1.12 = £26.79

Key Concept Check

- Explain why the multiplier for a 150% increase is 2.5
- Kenny buys a poncho in a 25% off sale. The sale price is £40. Kenny thinks the original cost is £50. Kenny is wrong! Explain why.
- Jenny says that increasing an amount by 200% is the same as multiplying by 3. Do you agree with Jenny? Explain why.

Key words used in this unit:

Fraction – One number divided by another number

Decimal – Numbers with a decimal point

Percentage – Number of parts out of 100

Numerator – The top number in a fraction

Denominator – The bottom number in a fraction

Simplify – To change to an equal but simpler form

Original Amount – the quantity there is before the percentage change

Multiplier – the (decimal) number that the original amount is multiplied by to achieve the required percentage

Simple interest – is when the same percentage of the original amount is paid each time, so the interest is always the same amount

Compound Interest – when the interest earned is added to the original amount, then the subsequent interest is earnt on the new total