

YEAR 9 — REASONING WITH NUMBER... Using Percentages

@whisto_maths

What do I need to be able to do?

By the end of this unit you should be able to:

- Use FDP equivalence
- Calculate percentage increase and decrease
- Express percentage change
- Solve reverse percentage problems
- Solve percentage problems (calculator and non calculator problems)

Keywords

- Percent:** parts per 100 — written using the % symbol
Decimal: a number in our base 10 number system. Numbers to the right of the decimal place are called decimals.
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.
Invest: use money with the goal of it increasing in value over time (usually in a bank).
Multiplier: the number you are multiplying by.
Profit: the income take away any expenses/ costs.

FDP Equivalence

Percentage
100% = a whole = 100 hundredths

One Whole = 1

10 hundredths
10 out of 100
10%

One hundredth
(one whole split into 100 equal parts)

$$\frac{10}{100} = \frac{1}{10} = 0.10$$

ones	tenths	hundredths
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Converting FDP

70/100

This also means 70 - 100

70 out of 100 squares
70 "hundredths"
= 7 "tenths"
0.7

70 hundredths = 70%

Using a calculator

Convert to a decimal

× 100 converts to a percentage

Be careful of recurring decimals
eg $\frac{1}{3} = 0.3333333$
 $\frac{1}{3} = 0.\dot{3}$
The dot above the 3

Percentage Increase/ Decrease

Decrease

100%

42% Decrease by 58%

Increase

100%

Increase by 12%

Multiplier Less than 1

$$100 - 0.58 = 0.42$$

Multiplier More than 1

$$100\% + 12\% = 112\%$$

$$100 + 0.12 = 1.12$$

Percentage change

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

100%

£200

£125

All values of change compare to the ORIGINAL value

Percentage loss

$$\frac{75}{200} \times 100 = 37.5\%$$

Reverse Percentages

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

Original Number (100%)

16

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

140% of my number is 84.
What is the original number?

Original Number (100%)

84

140% = 84
10% = 6
100% = 60

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

$$\frac{\text{Difference in values}}{\text{Original value}} \times 100$$

I bought a house for £180,000, I later sold it for £216,000.

100%

£180,000

Percentage profit

Money made (profit value)

$$\frac{36000}{180000} \times 100 = 20\%$$