

Calculating a percentage change

Sunday, 12 April 2020 10:49 am

★ By the end of the lesson I would hope that you have an understanding and be able to apply to questions the following concepts:

- Know what it means to have a percentage change and,
- Know how to calculate a percentage change

RECAP

We are nearing the end of the work on Real Numbers at a Year 8 level.

Pretty soon we move onto the next section which deals with Circles.

Before we move on, we need to be able to do more things:

- Calculate (and understand) what a percentage change is.
- Understand the unitary method.

Building on the idea of the last lesson, where we were increasing and decreasing by a percentage, it's now important to know how to find a percentage change.

For example, if I know the original price of an item and, for example, the same price, can I work out the percentage change.

RECAP: Important Language

Those students who have strong language skills will generally have very strong Maths skills.

Most of the problems students face in maths is not the Maths, but understanding what the question is asking of you.

Here is some important language:

- **Discount:** How much is being taken away from a sale price
- **Profit:** How much more someone gets for selling something than they paid for it
- **Loss:** The amount of money which is lost between the purchase price and the sale price
- **Percentage Error:** The difference between an estimated value and an exact value.

Three (but one!) formulas to help

The formulas you need to be able to work out a percentage change are shown below:

$$\text{Percentage change} = \frac{\text{change}}{\text{original value}} \times 100\%$$

$$\text{Percentage profit} = \frac{\text{profit}}{\text{original value}} \times 100\%$$

$$\text{Percentage loss} = \frac{\text{loss}}{\text{original value}} \times 100\%$$

Knowing these formulas are the same is really helpful!

The most important word (in the first formula) is the **change**.

It means you're going to have to do a calculation **before** you can use the formula.

Let's look at some examples

Example

The following example is taken, with permission, from the Cambridge Essentials Year 8 Textbook

Calculate the percentage change (profit/loss) when \$25 becomes \$32

Question: "Has the money gone up or down?"

up

Question: By how much has it gone up or down?

$$32 - 25 = 7$$

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Calculate the percentage change (profit/loss) when \$25 becomes \$32

Question: "Has the money gone up or down?"

up

Question: By how much has it gone up or down?

$$32 - 25 = 7$$

$$\% \text{ change} = \frac{7}{25} \times 100 \\ = 28\%$$

$$\therefore \% \text{ change} = 28\% \text{ increase}$$

$$100\% + 28\% = 128\%$$

128% of 25

$$= \frac{128}{100} \times 25 = \$32$$

Example

The following example is taken, with permission, from the Cambridge Essentials Year 8 Textbook

Calculate the percentage change (profit/loss) when \$60 becomes \$48

Question: "Has the money gone up or down?"

Down (Decrease)

Question: By how much has it gone up or down?

$$\begin{aligned} \% \text{ change} &= \frac{\text{change}}{\text{sv}} \times 100\% \\ &= \frac{(60 - 48)}{60} \times 100\% \\ &= \frac{12}{60} \times 100\% \\ &= 20\% \text{ decrease} \end{aligned}$$

60 - 48
12

$$100\% - 20\% = 80\%$$

$$80\% \text{ of } 60 = \frac{80}{100} \times 60 = \$48$$

$$100\% \text{ of } 60 = \frac{60 \times 60}{100} = \dots$$

Example

The following example is taken, with permission, from the Cambridge Essentials Year 8 Textbook

Ross buys a ticket to a concert for \$125, but is later unable to go. He sells it to his friend for \$75. Calculate the percentage loss Ross made.

Question: "Has the money gone up or down?"

$$125 - 75 = 50$$

↓ decrease

Question: By how much has it gone up or down?

$$\begin{aligned}\% \text{ change} &= \frac{\text{change}}{\text{s.v.}} \times 100\% \\ &= \frac{50}{125} \times 100\% \\ &= 40\% \text{ decrease}\end{aligned}$$

$$100\% - 40\% = 60\%$$

60% of 125

$$\frac{60}{100} \times 125 = \$75!$$