Decreasing and increasing by a percentage

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:

- To know the meaning of a number of terms which might be applied to buying and selling products
- How to find the new value of an amount if it is being increased or decreased by a percentage amount

RECAP

We are continuing with the fractions, decimals and percentages work.

Knowing how to convert between fractions, decimals and percentages is really important.
It is the basis for much of the rest of the work you are about to do.
Understanding what a percentage stands for is vitally important

RECAP: What actually is a percentage?

It is really just a measure of how much you have **compared to something else**.

On it's own 50% doesn't really mean anything.

60%

But, when we compare it then we know we might have a half of something.

If we have 25% then it might mean we have scored a quarter of the marks available in a test.

If we have 90% then it might mean we have nearly all of the marks needed to get an A+.

100%

RECAP: Percentages greater than 100

It is absolutely possible to have percentages which are greater than 100.

This simply means we have more than we started with (or more, in **comparison**, to someone else).

For example 150% means ...

150%

100% + 50% = 150%

50% more

150% → $\frac{150}{100}$ = 1.5

1.5 times bigger

What does 200% mean?

200%

100% + 100% = 200%

100% more

100% more

$200\% = \frac{200}{100} = 2$ 2 times bigger

We can express this is two ways:

- Twice as much as we started with
- 100% more than we started with.

Increasing by a percentage (Method 1)

There are, in fact, two ways of being able to increase by a percentage.
Both are equally valid.
One is slightly harder to understand, but cuts down the working out.

Let's start with the way which needs working out!

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

Find the new value when \$160 is increased by 40%

1. 40% of \$160

$\frac{40}{100} \times 160 = \$64$ increase!

2. Add increase to original value

100% + 40% = 140%

\$160 + \$64 = \$224

Increasing by a percentage (Method 2)

This method uses less working out.
It used the idea what we are adding onto 100% or subtracting from 100% depending on whether we are increasing (adding) or decreasing (subtracting).

Let's use the same example as above.

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

Find the new value when $160 is increased by 40%

100% + 40% = 140%

140% of what I started with

140% of $160

$= \frac{140}{100} \times 160 = \$224$

Later on I'll show the two methods for a decreasing amount. Let's look at a question where they are worked out side by side using the two methods.

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

Find the new value when $63 is increased by 20%

$63 ↑ 20%.

1. 20% of $63

$\frac{20}{100} \times 63 = \$12.60$

2. $63 + $12.60

$= \$75.60$

100% ↑ 20%.

100 + 20 = 120%.

120% of $63

$= \frac{120}{100} \times 63$

$= \$75.60$

= $15.60

Real world examples

We use percentages a lot in the real world.
There are always sales saying 10% off.
Knowing how to find percentages is incredibly useful!

Example
The following examples are taken, with permission, from the Cambridge Essentials Year 8 Textbook

Find the cost of a $860 television that has been discounted by 25%.

1. $860 ↓ 25%.

25% of $860

$\frac{25}{100} \times 860 = \$215$

2. $860 − $215

= $645

100% ↓ 25%.

100% − 25% = 75%.

75% of $860

$\frac{75}{100} \times 860$

= $645

Find the cost of a $250 microwave oven that has been marked up by 12%.

100% ↑ 12.5%.

100% + 12.5% = 112.5%.

$\frac{112.5}{100} \times \$250$

= $281.25