

## Increase or decrease by a percentage

### Starter

**You may use your calculator for all the questions in the starter.**

- (Review of last lesson)** The mass of the Earth is  $5.97 \times 10^{24}$  kg and the mass of the Sun is  $1.988 \times 10^{30}$  kg. How many times heavier is the Sun?
- (Review of last lesson)** Given that  $L = 2\sqrt{\frac{a}{k}}$ , find the value of L in standard form when  $a = 4.5 \times 10^{12}$  and  $k = 5 \times 10^7$ .
- (Review of previous material)**
  - Find 4% of 63 km.
  - Increase £85 by 17%.
- Copy and complete the following by writing the correct decimal in place of the box:
 

(a) 53% of 650 = $\square \times 650$	(b) Decrease 8 by 23% = $8 \times \square$
(c) Increase 75 by 24% = $75 \times \square$	(d) 4% of 250 = $\square \times 250$

### Notes

The quickest method to increase (or decrease) by a percentage uses the percentage multiplier.

### Success Criteria – increase/decrease by a percentage

- Add** or **subtract** the percentage to 100% depending on whether it is percentage **increase** or **decrease**.
- Express the percentage in step 1. as a decimal by dividing by 100.
- Multiply the quantity by the decimal found in step 2.

**E.g. 1** Using a calculator:

- |                          |                           |
|--------------------------|---------------------------|
| (a) increase 490 by 8%   | (b) decrease 627 by 21%   |
| (c) decrease 728 by 6%   | (d) increase 329 by 78%   |
| (e) increase 839 by 4.7% | (f) decrease 194 by 13.6% |

*Do not round your answers.*

**Working:** (a) **Increase** by 8% :  $100\% + 8\% = 108\% = \frac{108}{100} = 1.08$   
 Increase 490 by 8% =  $490 \times 1.08 = 529.2$

**E.g. 2** Copy and complete the following by writing the correct decimal in place of the box:

- |   |   |
|---|---|
| (a) Increase 92 by 7.3% = $92 \times \square$ | (b) Decrease 11 by 2.9% = $11 \times \square$ |
|---|---|

**Working:** (a) **Increase** by 7.3% :  $100\% + 7.3\% = 107.3\% = \frac{107.3}{100} = 1.073$   
 The box should be replaced by 1.073.

**E.g. 3** Two years ago Martha earned £25,000 per annum. Last year she got a pay rise of 3%. This year she got a pay rise of 2%. How much does she earn now?

**E.g. 4** Last year a club had 2500 members who each paid £95 annual subscription. This year, the number of members went up by 9% so the annual subscription was reduced by 6%. How much more money does the club have this year compared to last year?

**E.g. 5** Copy the complete:

“Doubling means to increase a quantity by \_\_\_% and trebling means to increase by \_\_\_%.”

**Video:**

[Increasing or decreasing by a percentage](#)

[Solutions to Starter and E.g.s](#)

### Exercise

9-1 class textbook:	p26 M2.1 Qu 1-13
A*-G class textbook:	p24 M2.1 Qu 2-18
9-1 homework book:	p7 M2.1 Qu 1-9
A*-G homework book:	p5 M2.1 Qu 1-10

### Summary

Success Criteria — increase/decrease by a percentage:

1. **Add** or **subtract** the percentage to 100% depending on whether it is percentage **increase** or **decrease**.
2. Express the percentage in step 1. as a decimal by dividing by 100.
3. Multiply the quantity by the decimal found in step 2.