Percentage change: fact sheet

Planner week 2 · Learn these facts

Percentage change

$$\frac{\text{change}}{\text{original}} \times 100$$

Divide the change by the **original** amount

Then × 100

Increase by a %

£500 + 4%

500 × 1.04 = £520

100% + 4% = 104% = 1.04

Multiply by 1.04

Decrease by a %

£500 − 20%

500 × 0.8 = £400

100% − 20% = 80% = 0.8

Multiply by 0.8

Multipliers

+ 9%	**× 1.09**
+ 30%	**× 1.3**
− 15%	**× 0.85**
− 30%	**× 0.7**

Turn the new percentage into a decimal

100% + or − the change

Which sheet do I need?

Increasing and decreasing by a percentage ▸
you have the ORIGINAL amount

Reverse percentages ▸
you have the NEW amount and want the original

Percentage change, profit and loss ▸
you have BOTH and want the percentage

Key words

- **Original** the amount before the change
- **Multiplier** the decimal you multiply by
- **Profit** money made: sell − cost
- **Reverse** work back to the original

Percentage profit

Buy £10, sell for £12

profit = £2

2 ÷ 10 × 100 = 20%

Profit = selling price − cost

Divide by what was paid

Percentage loss

Buy £80, sell for £56

loss = £24

24 ÷ 80 × 100 = 30%

Loss = cost − selling price

Divide by what was paid

Reverse percentages

30% off → sale price £280

£280 is 70%

280 ÷ 0.7 = £400

Price **after** the change → find the original

Divide by the multiplier

Which kind of question?

Change	"percentage increase / profit / loss"
New amount	"increased / reduced by 15%"
Reverse	"the **sale** price is … work out the **normal** price"

Exam tips

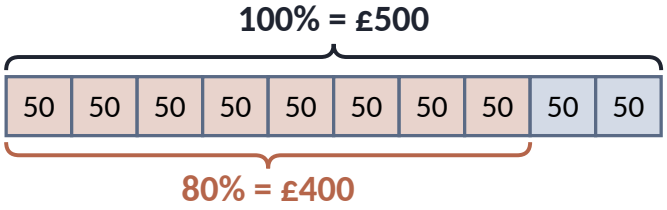
- Always divide by the **original** amount (the cost, the old price).
- Put money in the **same units** first: 50p = £0.50.
- Reverse percentage: **never** add 30% back on. Divide by 0.7.
- Two changes one after another (−10% then −20%): do them **one at a time**.
- "Is he correct?": work it out, then write **Yes** or **No** and the numbers.
- Round only at the **end**, to the accuracy asked for.

Increasing and decreasing by a percentage: fact sheet

Percentage change · Planner week 2 · Work out which type it is, follow the example

1 ORIGINAL given: decrease

A TV costs £500. In a sale, the price is reduced by 20%. Work out the sale price.



1. **Non-calculator**: 10% = 500 ÷ 10 = £50, so 20% = £100
2. Take it off: 500 − 100 = **£400**
3. **Calculator**: 100% − 20% = 80% = 0.8
4. 0.8 × 500 = **£400**

Use this when: the amount is before the change, and you want the new amount

2 ORIGINAL given: increase

Azmol is paid £1500 a month. He gets a 3% increase. Work out his new pay.

100% + 3% = 103%

1.03 × 1500 = **£1545**

1. **Non-calculator**: 1% = 1500 ÷ 100 = £15, so 3% = £45
2. Add it on: 1500 + 45 = **£1545**
3. **Calculator**: 100% + 3% = 103% = 1.03
4. 1.03 × 1500 = **£1545**

Use this when: the amount goes up: VAT, a pay rise, interest

3 Two changes

A bike costs £500. Its price goes up by 10%, then the new price goes down by 20%. Work out the final price.

500 × 1.1 = 550

550 × 0.8 = **£440**

1. First change: 500 × 1.1 = £550
2. Second change uses the **new** amount: 550 × 0.8 = **£440**
3. Not 10% off in one go: that would give £450

Use this when: there is more than one change, one after the other

The big question

Have I been given the **ORIGINAL** (before the change), the **NEW** amount (after the change), or **BOTH**?

Original: Increasing and decreasing. New: Reverse percentages. Both: Percentage change.

Careful: *sale price*, *after* and *now* mean you have the new amount.

Watch out

- Writing 4% as 0.4 (it is 0.04).
- Stopping at the increase (£45) instead of the new amount (£1545).
- Joining two changes into one: + 10% then − 20% is not − 10%.

Percentage change, profit and loss: fact sheet

Percentage change · Planner week 2 · Work out which type it is, follow the example

1 BOTH given: percentage change

A shop buys a lamp for £80. It sells the lamp for £56. Work out the percentage loss.

percentage change = change ÷ original × 100

1. **Find the change**: 80 − 56 = £24 loss
2. **Divide by the original**: 24 ÷ 80 = 0.3
3. **Multiply by 100**: 0.3 × 100 = **30% loss**
4. **Check**: 30% of 80 = 24 ✓

Use this when: you know the amount before and after, and you want the percentage

2 Profit with totals

Ali buys 20 pens for £8 altogether. He sells each pen for 50p. Work out his percentage profit.

money in: 20 × £0.50 = £10

money out: £8

1. Work out the **totals** first: he gets 20 × £0.50 = £10
2. **Find the change**: 10 − 8 = £2 profit
3. **Divide by the original**: 2 ÷ 8 = 0.25
4. **Multiply by 100**: **25% profit**

Use this when: there are lots of items, or pence and pounds

The big question

Have I been given the **ORIGINAL** (before the change), the **NEW** amount (after the change), or **BOTH**?

Original: Increasing and decreasing. New: Reverse percentages. Both: Percentage change.

Careful: *sale price*, *after* and *now* mean you have the new amount.

Watch out

- Dividing by the new amount instead of the original.
- Mixing pence and pounds (50p = £0.50).
- Giving the profit in £ when the question asks for a %.

Reverse percentages: fact sheet

Percentage change · Planner week 2 · Work out which type it is, follow the example

1 NEW amount given: after a decrease

In a sale, prices are reduced by 30%. The sale price of a jacket is £280. Work out the normal price.

	70%	£280
÷ 7	10%	£40
× 10	**100%**	**£400**

1. **Which %?** 100% − 30% = 70%
2. **Table**: 70% = £280
3. ÷ 7 for 10%, then × 10 for 100%: **£400**
4. **Check**: 70% of 400 = 280 ✓

Use this when: the amount is after the change, and you want the original

2 NEW amount given: after an increase

After a 20% pay rise, Ali earns £360 a week. How much did he earn before?

	120%	£360
÷ 12	10%	£30
× 10	**100%**	**£300**

1. **Which %?** 100% + 20% = 120%
2. **Table**: 120% = £360
3. ÷ 12 for 10%, then × 10 for 100%: **£300**
4. **Check**: 300 × 1.2 = 360 ✓

Use this when: it says “after”, “now” or “including VAT” and wants the amount before

The big question

Have I been given the **ORIGINAL** (before the change), the **NEW** amount (after the change), or **BOTH**?

Original: Increasing and decreasing. New: Reverse percentages. Both: Percentage change.

Careful: *sale price*, *after* and *now* mean you have the new amount.

Watch out

- Adding 30% to £280 (that gives £364, not £400).
- Taking 20% off £360 (that gives £288, not £300).
- Calculator: divide by the multiplier (280 ÷ 0.7), never multiply.