



THIRD SPACE  
LEARNING

# GCSE Maths Intervention Pack

## Calculating Percentages

Grade 3

## Teacher Notes

### Question Sets

#### Set 1: Percentages of Amounts

Calculate the percentage of an amount by finding simple percentages  
and by using a multiplier

Key words: Convert, decimal, fraction, multiplier, percent

#### Set 2: Percentage Increase

Increase an amount by a percentage

Key words: Convert, increase, multiplier, original amount, percent

#### Set 3: Percentage Decrease

Decrease an amount by a percentage

Key words: Convert, decrease, multiplier, original amount, percent



Scan to discover our  
GCSE maths revision  
resources



“We now tell our staff that if Third Space Learning do a version of that resource, prioritise it over all of the alternatives, because we feel that they are always the best ones.”



**Gabriel Ogbeifun,**  
Head of Mathematics, Regent High School

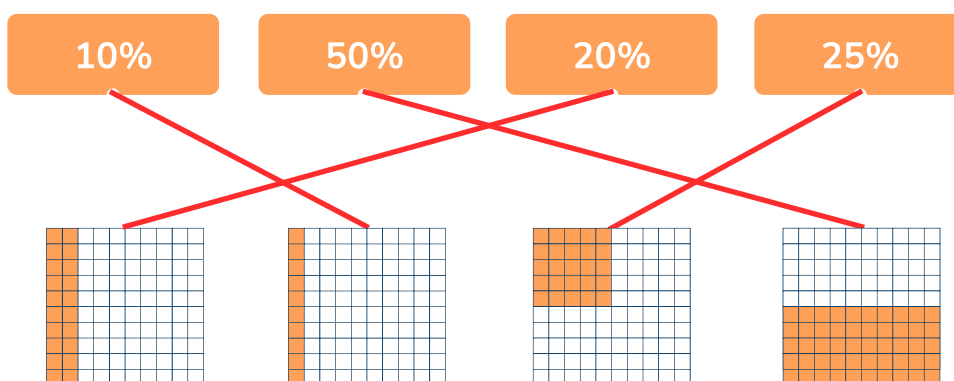


## Slide 1: Cover Slide

### Teaching Prompts

- Can you match together the diagrams and the percentages?
  - What is a percentage out of?
  - How many squares are represented in the diagrams?
- 

### Answers



### Teacher Reference Only

#### Common Misconceptions

- Pupils may not make the connection that a percentage is a different way of describing a proportion.
  - Pupils may think that it is not possible to have a percentage greater than 100%
  - Students have misconceptions about multipliers for increase and decrease. E.g. Students think the percentage multiplier for a 20% increase or decrease is 0.2.
- 

### Terminology

- Percentage: The number of parts per 100.
- Equivalent: Having the same value.
- Convert: To change a value or expression from one form to another.
- Increase: Make something bigger (in size or quantity).
- Decrease: Make something smaller (in size or quantity).

## Slide 2: Try this exam-style question...

### Set 1: Percentages of Amounts.

#### Teaching Prompts

- Can you try this question by yourself?
- 

#### If Stuck

- Move on to the next slide.
- 

#### Mark Scheme

- (1 mark) converts 20% to 0.2

OR  $\frac{20}{100}$

OR starts to find 20% by either finding 10% by dividing by 10, or 20% by dividing by 5

- (1 mark) £100
-

## Slide 3: Let's go through it together...

Set 1: Percentages of Amounts.

### Teaching Prompts

- 1) What calculation can we use to find 10%? (divide by 10)
  - 2) How can we find 20% from 10%? (multiply by 2)
- 

### Answers

1. £50
  2. £100
- 

### Mark Scheme

- (1 mark) starts to find 20% by either finding 10% by dividing by 10, or 20% by dividing by 5
  - (1 mark) £100
-

## Slide 4: Let's go through it together...

Set 1: Percentages of Amounts.

### Teaching Prompts

1) How could we write 20% as a fraction?  $\left(\frac{20}{100}\right)$

1) How could we write it as a decimal? (0.2)

---

### Answers

- $\frac{20}{100} \times 500$
  - $0.2 \times 500 = \text{£}100$
- 

### Mark Scheme

- (1 mark) converts 20% to 0.2 OR  $\frac{20}{100}$
- (1 mark) £100

## Slide 5: Your turn...

Set 1: Percentages of Amounts.

### Teaching Prompts

- What method could you use to solve this?
  - How could you find 25% using calculations? (either find  $10\% + 10\% + (\frac{1}{2})10\%$  OR divide by 4)
  - How could you find 25% using a multiplier? ( $\times \frac{25}{100}$  or  $\times 0.25$ )
- 

### Mark Scheme

- (1 mark) converts 25% to 0.25 OR  $\frac{25}{100}$   
OR starts to find 25% by either finding 10% by dividing by 10, or 25% by dividing by 4
- (1 mark) £3

## Slide 6: Try this exam-style question...

### Set 2: Percentage Increase.

#### Teaching Prompts

- Can you try this yourself?
- 

#### If Stuck

- Move on to the next slide.
- 

#### Mark Scheme

- (1 mark) finds 12% (£2.88) or identifies the multiplier as 1.12
  - (1 mark) £26.88
- 

#### Watch out for

- Pupils may think that it is not possible to have a percentage greater than 100%
- Show pupils how mixed numbers and improper fractions will produce percentages greater than 100%.
- Students have misconceptions about multipliers for increase and decrease
- E.g. Students think the percentage multiplier for a 20% increase or decrease is 0.2
- Explain that an increase means adding on a percentage to the original amount, so we already have 100% and we need to add on 20%, so the percentage multiplier is for 120% and therefore 1.2

## Slide 7: Let's go through it together...

Set 2: Percentage Increase.

### Teaching Prompts

- How do we find 10%? (divide by 10)
  - How do we find 1%? (divide by 100)
- 

### Answer

1. Find 12% of £24

$$10\% = 2.4$$

$$1\% = 0.24$$

$$12\% = 2.88$$

2. Add on 12% to the original amount to find the increased price.

$$24 + 2.88 = 26.88$$

---

### Mark Scheme

- (1 mark) finds 12% (£2.88)
- (1 mark) £26.88

## Slide 8: Let's go through it together...

Set 3: Percentage Increase.

### Teaching Prompts

- What percentage do we have in total if we are adding on 12%? (112%)
  - How can we write 112% as a multiplier? ( $\frac{112}{100}$  or 1.12)
- 

### Answers

$$\begin{aligned}\frac{112}{100} \times 24 \\ &= 1.12 \times 24 \\ &= £26.88\end{aligned}$$

---

### Mark Scheme

- (1 mark) identifies the multiplier as 1.12
- (1 mark) £26.88



## Slide 9: Your turn

Set 3: Percentage Increase.

### Teaching Prompts

- How could we add on 15%? (find 10% and 5% and add to original)
  - What percentage do we have in total if we are adding on 15%? (115%)
  - How can we write 115% as a multiplier? (  $\frac{115}{100}$  or 1.15)
- 

### Mark Scheme

- (1 mark) finds 15% (1.8) or identifies multiplier as 1.15
  - (1 mark) £13.80
-

## Slide 10: Try this exam-style question...

### Set 3: Percentage Decrease.

#### Teaching Prompts

- Can you try this yourself?
- 

#### If stuck

- Move on to the next slide.
- 

#### Mark Scheme

- (1 mark) finds 70% (84) or identifies multiplier as 0.3
  - (1 mark) £36
-

## Slide 11: Let's go through it together...

Set 3: Percentage Decrease.

### Teaching Prompts

- How can we find 10%? (divide by 10)
  - How can we find 70% from 10%? (multiplying by 7)
- 

### Answers

1. Find 70% of £120

$$\begin{array}{ccccc} & 10\% & = & 12 & \\ \times 7 \swarrow & & & \swarrow & \times 7 \\ \dots\dots\dots & 70\% & = & 84 & \dots\dots\dots \end{array}$$

2. Subtract 70% from the original amount to find the decreased price.

$$120 - 84 = 36$$

---

### Mark Scheme

- (1 mark) finds 70% (84) or identifies multiplier as 0.3
  - (1 mark) £36
-

## Slide 12: Let's go through it together...

Set 3: Percentage Decrease.

### Teaching Prompts

- What is our total percentage if we are subtracting 70%? (30%)
  - What will the multiplier be for 30%? ( $\frac{30}{100}$ , 0.3)
- 

### Answers

$$\begin{aligned} &\frac{30}{100} \times 120 \\ &0.3 \times 120 \\ &= 36 \end{aligned}$$

---

### Mark Scheme

- (1 mark) finds 70% (84) or identifies multiplier as 0.3
- (1 mark) £36

## Slide 13: Your turn

Set 3: Percentage Decrease.

### Teaching Prompts

- Which method do you want to use?
  - How could you find 20%? (find 10% and multiply by 2, or divide by 5)
  - What is our total percentage if we are subtracting 20%? (80%)
  - What will the multiplier be for 80%? ( $\frac{80}{100}$ , 0.8)
- 

### Mark Scheme

- (1 mark) finds 20% (84) or identifies multiplier as 0.8
- (1 mark) £336

## Slide 14: Ready for a Challenge?

### Teaching Prompts

- Can you try this yourself using the formula?
- 

### If Stuck

- What is the change in the amount? ( $32 - 20 = 12$ )
  - What is the original value? (£20)
  - Can you substitute these into the formula to find the percentage change?
- 

### Mark Scheme

- (1 mark) identifies change in amount as £12
- (1 mark)  $\frac{12}{20} \times 100 = 60\%$  increase

## Slide 15: What have we learnt?

### Teaching Prompts

- a) Can you see where the student has gone wrong? (divided by 25 to find 25%)
  - a) What should they have done instead?
  - a) To find 25% we can divide by 4
  - a)  $25\% : 150 \div 4 = 37.5$
  - a)  $1\% : 150 \div 100 = 1.5$
  - a)  $26\% = 37.5 + 1.5 = 39$
  
  - b) Can you see where the student has gone wrong? (they have not added on the percentage to the original amount)
  - b) What should they have done instead?
  - b) To find an increase they need to add on the percentage to the original amount  
 $\pounds 42 + 12.60$
- 

### Answers

- a) 39
- b)  $\pounds 54.60$

# Calculating Percentages

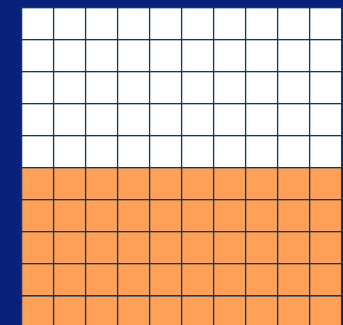
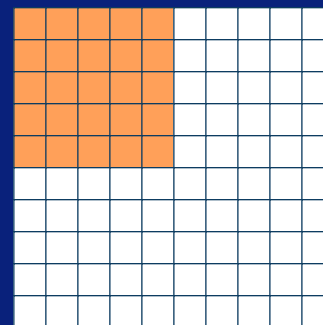
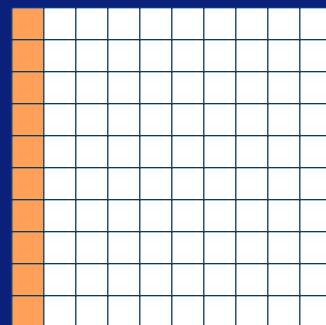
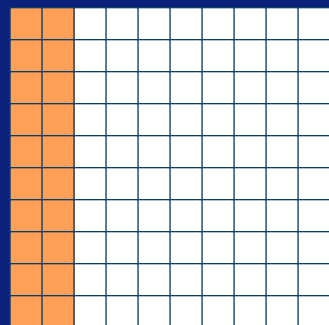
Match the diagrams with the percentages shown.

10%

50%

20%

25%





## Try this exam-style question...

Henri wants to rent a room in a flat for £500 a month.

To secure the flat he needs to put down a 20% deposit at the beginning of the month.

How much money does Henri need for his deposit?

## Let's go through it together...

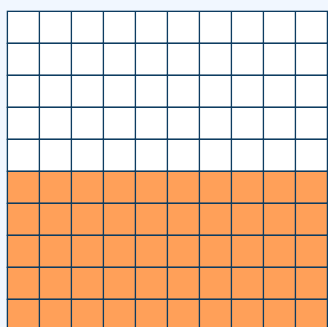
Henri wants to rent a room in a flat for £500 a month.

To secure the flat he needs to put down a 20% deposit at the beginning of the month.

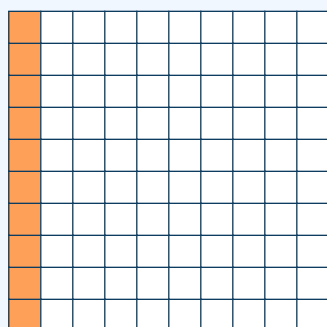
How much money does Henri need for his deposit?

### Method 1:

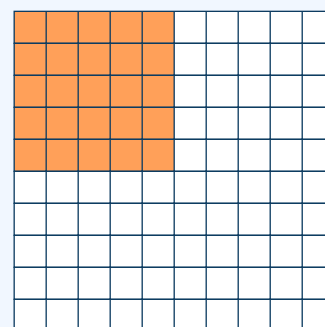
There are some quick calculations we can remember in order to calculate simple percentages of amounts.



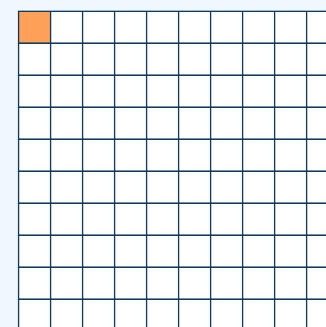
Find 50% means  $\div 2$



Find 10% means  $\div 10$



Find 25% means  $\div 4$



Find 1% means  $\div 100$

1. Find 10% of £500
2. Find 20% of £500

## Let's go through it together...

Henri wants to rent a room in a flat for £500 a month.

To secure the flat he needs to put down a 20% deposit at the beginning of the month.

How much money does Henri need for his deposit.

### Method 2:

We can also use **multipliers** to find a percentage of an amount.

**Percent** means 'out of 100,' so we can write a percentage **as a fraction out of 100**, or **as a decimal**, by **dividing by 100**.

E.g. Find 30% of 60

$$\frac{30}{100} \times 60$$

$$0.3 \times 60$$

$$= 18$$

1. Use a multiplier to find 20% of £500

## Your turn...

Jerry runs a pie shop. His pies cost £12 each.

Jerry decides he needs to reduce the price of the pies by 25%.

By how much does Jerry reduce the cost of the pies?

## Try this exam-style question...

Kiera's railcard costs £24 a week.

The rail company is increasing its prices by 12%.

How much does Kiera's railcard cost now?

## Let's go through it together...

Kiera's railcard costs £24 a week.

The rail company is increasing its prices by 12%.

How much does Kiera's railcard cost now?

### Method 1:

To calculate a **percentage increase**, we need to calculate the percentage of the **original amount** and **add it on**.

1. Find 12% of £24

10% =

1% =

1% =

---

12% =

2. Add on 12% to the original amount to find the increased price.

Let's go through it together...

Kiera's railcard costs £24 a week.

The rail company is increasing its prices by 12%.

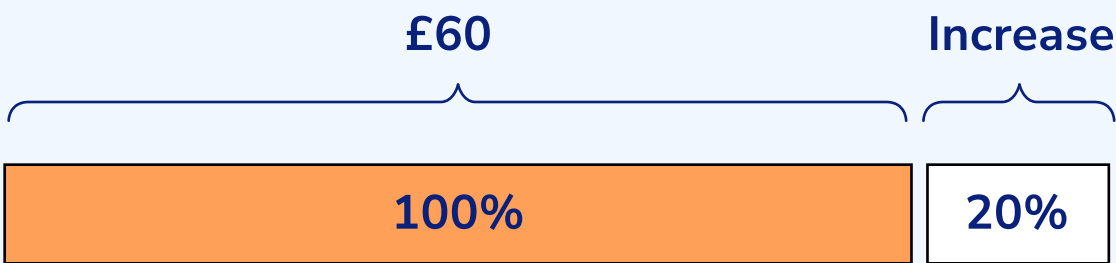
How much does Kiera's railcard cost now?

Method 2:

We can also use **multipliers** to find an **increase**.

If we think about an increase as a **percentage being added on** to the original whole (100%), we can find the increased amount all at once.

E.g. Increase £60 by 20%



In total we have  $100\% + 20\% = 120\%$

$$\frac{120}{100} \times 60$$
$$1.2 \times 60 = \text{£}72$$

- 1. Use a multiplier to increase £24 by 12%.

## Your turn...

Meera sells phone cases for £12.

She wants to increase the cost of the phone cases by 15%.

How much will they now cost?



## Try this exam-style question...

A coat costs £120.

There is a 70% off sale.

How much will it cost in the sale?

# Let's go through it together...

A coat costs £120.

There is a 70% off sale.

How much will it cost in the sale?

To calculate a **percentage decrease**, we need to calculate the percentage of the **original amount** and **subtract it**.

1. Find 70% of £120

$$\begin{array}{rcl} \times \dots\dots\dots & \left( \begin{array}{l} 10\% = \dots\dots\dots \\ 70\% = \dots\dots\dots \end{array} \right. & \times \dots\dots\dots \end{array}$$

2. Subtract 70% from the original amount to find the decreased price.

## Let's go through it together...

A coat costs £120.

There is a 70% off sale.

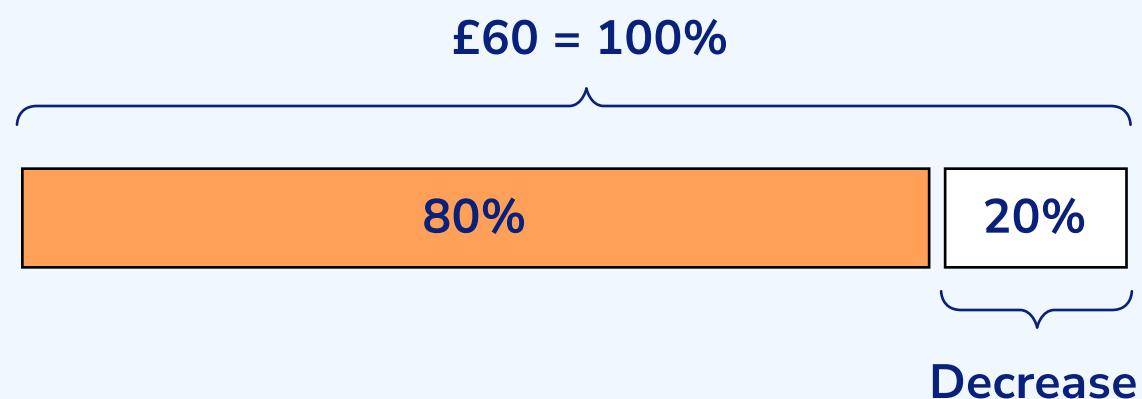
How much will it cost in the sale?

### Method 2:

We can also use **multipliers** to find a decrease.

If we think about an decrease as a percentage being **subtracted from** the original whole (100%), we can find the decreased amount all at once.

**E.g. Decrease £60 by 20%**



In total we have  $100\% - 20\% = 80\%$

$$\frac{80}{100} \times 60$$

$$0.8 \times 60 = \text{£}48$$

1. Use a multiplier to decrease £120 by 70%

## Your turn...

Liam is renting a holiday cottage for a week. The usual price is £420.

Liam has a 20% off voucher.

How much will it cost for him to rent the holiday cottage?

## Ready for a Challenge?

A restaurant increases the price of its Set Menu from £20 to £32.

By what percentage did they increase the price of the Set Menu?

By calculating **percentage change** we can find the percentage a value has been **increased or decreased** by using the formula:

$$\text{Percentage change} = \frac{\text{Change in amount}}{\text{Original value}} \times 100$$

Can you correct the answers to the questions below?

Find 26% of 150

$$25\% = 150 \div 25 = 6$$

$$1\% = 150 \div 100 = 1.5$$

$$6 + 1.5 = 7.5$$

.....

Increase £42 by 30%

$$10\% \text{ of } £42 = 4.2$$

$$\begin{aligned} 30\% \text{ of } £42 &= 4.2 \times 3 \\ &= £12.6 \end{aligned}$$

.....

# Where to go next?

For more diagnostic questions, and GCSE maths revision resources and worksheets to support students in fixing any misconceptions take a look at the free Third Space Learning [GCSE maths revision](#) pages.

Scan the QR code to discover our library of FREE GCSE maths revision resources

## Do you have KS4 students who need additional support in maths?



Our specialist tutors will help students to develop the skills they need to succeed at GCSE in weekly one to one online revision lessons. Trusted by secondary schools across the UK.

Visit [thirdspacelearning.com](https://thirdspacelearning.com) to find out more.