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The zip folder that you've just opened contains a PDF file with **interactive features**.

In a move towards offering an even more versatile spread of resources, some of our worksheets feature <u>interactive fields</u> that can be filled in on computers and smart devices, without having to print the page. Follow the guidance in the next column for a smooth, stress-free means of accessing this content using free-to-download PDF reading software.
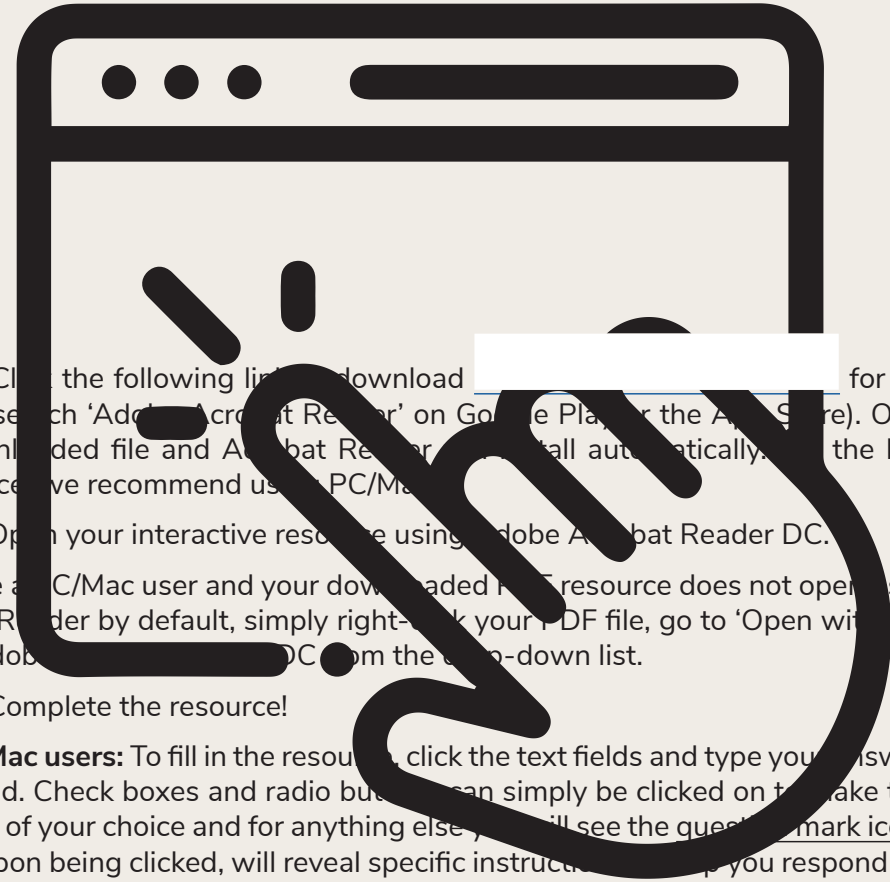
Step 1: Click the following link to download _____ for PC/Mac (or search 'Adobe Acrobat Reader' on Google Play or the App Store). Open the downloaded file and Acrobat Reader will install automatically. For the best experience we recommend using a PC/Mac.

Step 2: Open your interactive resource using Adobe Acrobat Reader DC.

If you are a PC/Mac user and your downloaded PDF resource does not open using Acrobat Reader by default, simply right-click your PDF file, go to 'Open with' and select Adobe Acrobat Reader DC from the drop-down list.

Step 3: Complete the resource!

For PC/Mac users: To fill in the resource, click the text fields and type your answers as needed. Check boxes and radio buttons can simply be clicked on to make the selection of your choice and for anything else you will see the question mark icon which, upon being clicked, will reveal specific instructions to help you respond to the corresponding question or activity. When you are finished with the resource, go to File > Save As... and save your file in a memorable location.

For smart device users: To fill in the resource, follow the same process as described above. When you are finished, simply press the back button in the top left of the appscreen and your PDF will save automatically.

Remember: Saving your PDF will overwrite the original file, so be sure to create a copy before starting if you wish to keep a blank copy of the resource on your device.

We hope you have found this information useful. If you experience any problems in following the instructions above, please contact the Beyond team at _____ and we will do our best to help with your query.

Percentage Change

It is useful to remember that **percent** comes from the words **per-** (meaning out of) and **-cent** (meaning 100). A percentage is measured out of 100.

It is common to give a change in value as a percentage. We can use the following formula to help us:

$$\text{Percentage "Change"} = \frac{\text{"Change"}}{\text{Original}} \times 100$$

More often than not, you will see "change" referred to as many different things in exam questions, such as: percentage profit, percentage loss, depreciation, percentage increase, percentage decrease, and so forth.

Example 1

Jasper's salary has increased from $18 400 to $20 100. By what percentage has his salary increased? Give your answer correct to two decimal places.

Start by working out by how much his salary has increased. This is the "change" in this question.

20 100 – 18 400 = $1700

Next, form a fraction by using the "change" ($1700) as the numerator and the original value as the denominator ($18 400):

$$\frac{1700}{18\ 400}$$

Now, multiply the fraction by 100 to convert it to a percentage:

$$\frac{1700}{18\ 400} \times 100 = \textbf{9.24\% increase (2d.p.)}$$

If a calculator is available for the question, use the fraction button then multiply by 100. If not, remember that the line in a fraction means divide, so divide the numerator by the denominator then multiply by 100.

Example 2

Asha bought a camera for $145 and sold it a year later for $100. Calculate the percentage loss, giving your answer correct to 1 decimal place.

This time the "change" is referred to as "percentage loss" but we can still calculate the change and then use the formula:

Change = 145 – 100 = $45

Percentage loss = $\frac{\text{Change}}{\text{Original}} \times 100$

Percentage loss = $\frac{45}{145} \times 100$

Percentage loss = **31.0% (1d.p.)**

Your Turn

Section 1

Fill in the table below to show the percentage change from the original value to its new value, giving your answers correct to the nearest whole number. The first one has been completed for you.

Original Value	New Value	Percentage Change
379	425	12% increase
5650	6000	
45	50	
10 700	8000	
3000	3450	
350	275	
5	2	
15	25	
22	15	

Section 2

1. In a sale, a coat costing $80 is reduced to $52. Calculate the percentage decrease.

2. In January, a puppy weighed 4kg. Three months later, the same puppy weighed 5kg. What was the percentage increase in the puppy's weight?

3. A piece is cut from a 130cm length of wood so that the remaining length is 104cm. What percentage of the wood has been cut off?

4. Last year, there were 300 students in year 7. This year, there are 315 students. Show that this is a 5% increase.

5. A piece of art was bought for $600. Six months later, it was sold for $675. What percentage profit did the seller make?

6. In a sale, the price of a sofa is reduced from $1200 to $800. Calculate the percentage decrease, giving your answer correct to 2 significant figures.

7. A car company bought a car for $8000. Two years later, they sold the car for $5500. Calculate their percentage loss.

8. The value of a painting rises from $15 500 to $28 450. Work out the percentage increase in the value of the painting, giving your answer correct to the nearest whole number.

9. Indie bought a dress for $70 and later sold it for $120. Find the percentage profit, giving your answer correct to three significant figures.

10. A shop normally sells their goods at 60% above cost price. In a sale, the shop reduces their prices by 10%. What percentage profit does the shop make on the goods sold in the sale?
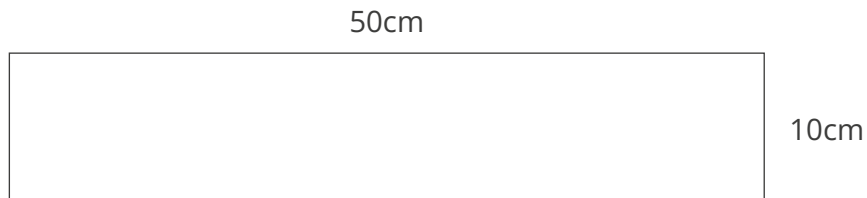
Challenge

The rectangle shown below has length 50cm and width 10cm.

The length of the rectangle is decreased by 30%.

The width of the rectangle is decreased by 15%.

Find the percentage decrease in the area of the rectangle.

50cm

10cm

Percentage Change **Answers**

Section 1

Fill in the table below to show the percentage change from the original value to its new value, giving your answers correct to the nearest whole number. The first one has been completed for you.

Original Value	New Value	Percentage Change
379	425	12% increase
5650	6000	**6% increase**
45	50	**11% increase**
10 700	8000	**25% decrease**
3000	3450	**15% increase**
350	275	**21% decrease**
5	2	**60% decrease**
15	25	**67% increase**
22	15	**32% decrease**

Section 2

1. In a sale, a coat costing $80 is reduced to $52. Calculate the percentage decrease.

   80 – 52 = $28

   $\frac{28}{80} \times 100 = 35\%$

2. In January, a puppy weighed 4kg. Three months later, the same puppy weighed 5kg. What was the percentage increase in the puppy's weight?

   5 – 4 = 1kg

   $\frac{1}{4} \times 100 = 25\%$

3. A piece is cut from a 130cm length of wood so that the remaining length is 104cm. What percentage of the wood has been cut off?

   130 – 104 = 26cm

   $\frac{26}{130} \times 100 = 20\%$

4. Last year, there were 300 students in year 7. This year, there are 315 students. Show that this is a 5% increase.

   315 – 300 = 15

   $\frac{15}{300} \times 100 = 5\%$

5. A piece of art was bought for $600. Six months later, it was sold for $675. What percentage profit did the seller make?

    675 – 600 = $75

    $\frac{75}{600}$ **× 100 = 12.5%**

6. In a sale, the price of a sofa is reduced from $1200 to $800. Calculate the percentage decrease, giving your answer correct to 2 significant figures.

    1200 – 800 = $400

    $\frac{400}{1200}$ **× 100 = 33% (2s.f.)**

7. A car company bought a car for $8000. Two years later, they sold the car for $5500. Calculate their percentage loss.

    8000 – 5500 = $2500

    $\frac{2500}{8000}$ **× 100 = 31.25%**

8. The value of a painting rises from $15 500 to $28 450. Work out the percentage increase in the value of the painting, giving your answer correct to the nearest whole number.

    28 450 – 15 500 = $12 950

    $\frac{12\ 950}{15\ 500}$ **× 100 = 84% (to the nearest whole number).**

9. Indie bought a dress for $70 and later sold it for $120. Find the percentage profit, giving your answer correct to three significant figures.

    120 – 70 = $50

    $\frac{50}{70}$ **× 100 = 71.4% (3s.f.)**

10. A shop normally sells their goods at 60% above cost price. In a sale, the shop reduces their prices by 10%. What percentage profit does the shop make on the goods sold in the sale?

    Let an item have a cost price of $100.

    60% above cost price: $160

    10% reduction in price: 0.9 × 160 = $144

    144 – 100 = 44

    $\frac{44}{100}$ **× 100 = 44%**

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Find the percentage decrease in the area of the rectangle.

50cm

10cm

$50 × 10 = 500cm^2$

$50 × 0.7 = 35cm$

$10 × 0.85 = 8.5cm$

$35 × 8.5 = 297.5cm^2$

$500 – 297.5 = 202.5cm^2$

$\dfrac{202.5}{500} × 100 = 40.5\%$ decrease.

Percentage Change

> **Prior Knowledge:**
>
> - Calculating percentages of amounts.
> - Percentage increase and decrease.
> - Calculating the difference between numbers.
> - Rounding to the nearest whole number, decimal places and significant figures.

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10cm

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