

Shortcut Percentages: 1%, 2%, 3%...

Overview

This activity is designed to introduce students to the very useful method of calculating 1% by finding one hundredth (or dividing by 100).

1% can be used to find 2%, 3% ... and these in turn can be added to 10%, 20% ... to calculate other percentages such as 23%, 34%, 12%.

The activity also provides opportunity to revise the fundamental meaning of percentage and simple fraction concepts.

Ideally this activity should be done after students have been introduced to shortcut methods for 50% and 25% by halving and 10% by dividing by 10.

Suggested Procedure

Introducing the activity

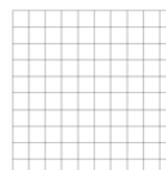
Remind students that they have so far used shortcuts to find 10%, 20%, 30% ... and 50% and 25% (and 75% in some cases). Tell them you are now going to show them another useful shortcut method: the method for finding 1%.

Explain that if they can find 1% then it is easy to find 2%, 3% etc. Then these can be used in combination with these other techniques to work out nearly any percentage they need. For example: 11% is 10% + 1%, 23% is 20% + 3%.

Reinforcing the meaning of percentage

Hold up one of the 100 square grids and ask:

- *How many small squares are there in this grid?*
- *Why is it useful for thinking about percentages?*



Skills and Knowledge

Calculating 1% by $\div 100$

Preparation and Materials

Photocopy Activity Sheet 1: *Large 100 Square Grid* (1 or 2 copies)

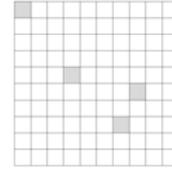
Photocopy Practice Sheets 1 & 2 (1 per student)



Introducing 1%

Quickly shade one square on the grid.

- *What percentage is this?*



Shade other squares randomly on the grid and repeat the question:

- *What percentage is this?*
- *And this?*

If students have a foundation of fraction concepts then you want to relate 1% to $\frac{1}{100}$ so that they will understand that 1% of something is the same as $\frac{1}{100}$.

Ask:

- *If there are 100 of these and they are all the same size what fraction is it?*

Write on the board:

$$\frac{1}{100} = 1\%$$

If students do not have a firm understanding of fractions, then you may prefer to emphasize that the whole grid has been **divided** into 100 equal pieces.

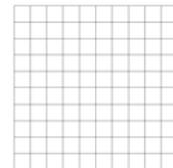
Explain:

- *You can use this to find 1% of any amount.*
- *For example let's look at \$500.*

Example: 1% of \$500

Use another 100 square grid with **\$500** written at the top so it is clearly visible.

\$500



Hold up the grid.

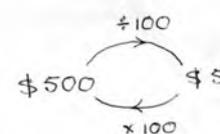
- *How many squares are there?*
- *Imagine this \$500 was divided into these 100 squares*
- *How much money would be in each square?*
- *How did you work it out?*

You want students to see that they need to divide by 100 so that there will be \$5 in each square. Emphasize that dividing by 100 is the same as finding one hundredth.

Checking the calculation

- *So we worked out 1% of \$500 = \$5*
- *Does that seem right?*
- *You can check division by going backwards*

Model the checking process for students by multiplying to see that \$5 times 100 will give you \$500.



Further Examples

Ask students to use the same method for some further examples:

Calculate 1% of: \$300; \$100; \$600; \$4,000; \$3,700; 400 cents
[Answers: \$3; \$1; \$6; \$40, \$37; 4 cents]

Circulate while students are doing these calculations to ensure they are using the **shortcut method for division by 100**, that is, crossing off the zeros.

If students need more practice at dividing by 100, or have not learned it before, refer to the 'in the head' Activity: *Multiplying & Dividing by Tens*.

Extending to 2%, 3% ...

Ask:

- We worked out 1% of \$500
- How could you use it to work out 3% of \$500?

On the board write:

$$1\% \text{ of } \$500 = \$5$$

$$3\% \text{ of } \$500 = 3 \times \$5 = \$15$$

Further Examples

Ask students to use the same method:

Calculate 3% of: \$300; \$100; \$600; \$4,000; \$3,700; 400 cents
[Answers: \$9; \$3; \$18; \$120, \$111; 12 cents]

Ask:

- How could you find 2% of the same amounts?
- Start with the \$500

On the board write:

$$1\% \text{ of } \$500 = \$5$$

$$2\% \text{ of } \$500 = 2 \times \$5 = \$10$$

Ask:

Calculate 2% of: \$300; \$100; \$600; \$4,000; \$3,700; 400 cents
[Answers: \$6; \$2; \$12; \$80, \$74; 8 cents]

A closer look at 400 cents

Once students are confident with round hundreds of dollars, e.g. \$200, \$500 ... you can examine other dollar amounts, starting with \$4 or 400 cents.

Ask:

- What's another way of writing 400 cents?
- Yes it is \$4
- You already calculated 1% of 400 cents



- So what is 1% of \$4?

On the board write:

$$\begin{aligned} \$4 &= 400 \text{ cents} \\ 1\% \text{ of } \$4 &= 400 \text{ c} \div 100 \\ &= 4 \text{ c} \end{aligned}$$

Explain:

- You can use the same thinking to calculate 1% for any dollar amount
- For example:

$$\begin{aligned} \text{Calculate 1\% of:} \quad & \$8; \$7; \$12; \$48; \$96; \$210 \\ & [\text{Answers: } 8\text{c}; 7\text{c}; 12\text{c}; 48\text{c}; 96\text{c}; \$2.10] \end{aligned}$$

Students may see the shortcut that saves them writing the whole calculation out. If they do then they should be encouraged to use it.

Students who can divide decimals by 100 may also realise that they can write \$96 as \$96.00

$$\begin{aligned} \$96 &\rightarrow \$96.00 & 96.00 \div 100 &= 0.96 \\ & & \text{So 1\% of } \$96 &= \$0.96 \text{ or } 96 \text{ cents} \\ & & \text{And 2\% of } \$96 &= 2 \times \$0.96 = \$1.92 \end{aligned}$$

Extending to 2%

Ask:

- How would you calculate 2% of \$4?
- Yes, multiply 1% by 2. So it is $2 \times 4\text{c} = 8\text{c}$
- Now calculate 2% of all of the amounts above

[Answers: 16c; 14c; 24c; 96c; \$1.92; \$4.20]

Check a few more examples together using 3% & 4% of whole dollar amounts until students are confident.

Practice Sheet 1 provides more practice at finding 1%, 2%, 3% ... of simple amounts as above.

Combining the shortcuts

Explain:

- We are now going to see how our shortcut methods can be combined to work out other percentages
- Do you remember how to work out 50% of \$60?
- Yes, its half of \$60 = \$30

On the board: $50\% \text{ of } \$60 \rightarrow \frac{1}{2} \text{ of } \$60 = \$30$

Ask:

- How could you use this to work out 51% of \$60?
- What's 1% of \$60 going to be?



On the board: 1% of $\$60 = 60c$
 51% is $50\% + 1\%$
 $\$30 + 60c = \30.60

Further examples in pairs

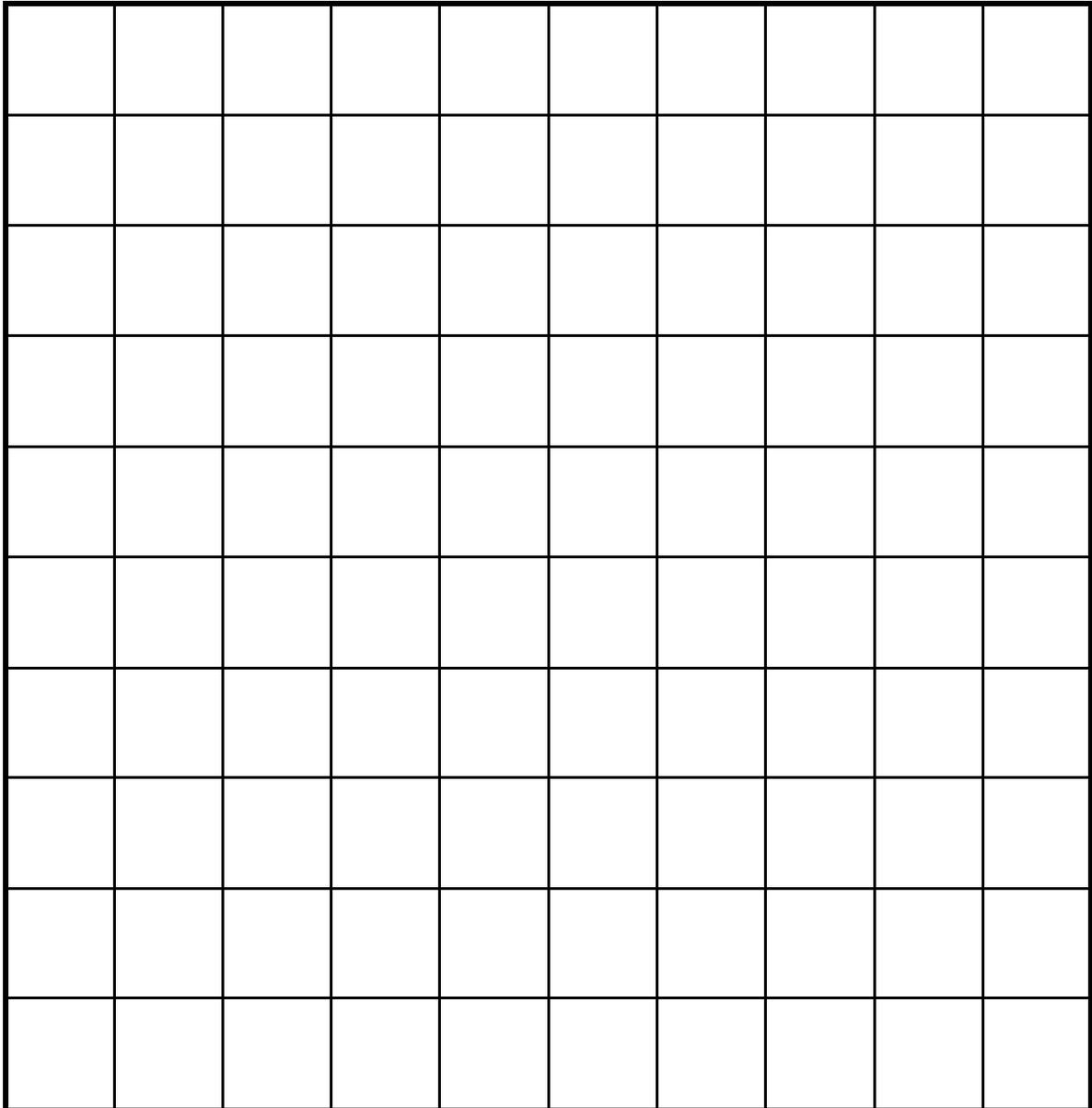
Ask students to work in pairs to think about how they could combine short cut methods for the following:

Calculate: 14% of $\$210$
 23% of $\$340$
 26% of $\$680$

[Answers: $14\% = 10\%$ add $4 \times 1\% \rightarrow \29.40
 $23\% = 2 \times 10\%$ add $3 \times 1\% \rightarrow \112.20
 $26\% = 25\%$ ($\frac{1}{2}$ then $\frac{1}{2}$) add $1\% \rightarrow \$173.40$]

Further examples can be found in *Practice Sheet 2*.

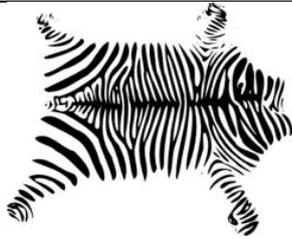
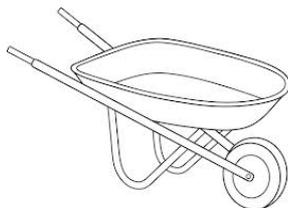




Price rises

Practice Sheet 1

To make up for a rise in costs Charlie's Cheap as Chips Shop raised all their prices by 2%. Calculate the rise and new price for these products.

 <p>Was \$9</p> <p>1% =</p> <p>2% =</p> <p>New price =</p>	 <p>Was \$11</p> <p>1% =</p> <p>2% =</p> <p>New price =</p>
 <p>Was \$27</p>	 <p>Was \$59</p>
 <p>Was \$160</p>	 <p>Was \$240</p>

Bella's Beautiful Bags put up the prices of all their bags and luggage by 3%. Calculate the new prices.

Style	Current price	1%	3% rise	New price
Rosa	\$60			
Caterina	\$72			
Patrizia	\$112			
Mina	\$135			
Venezia	\$154			



Combine shortcut percentage strategies to calculate these the quickest way you can.

1. 11% of \$300
2. 14% of \$700
3. 21 % of \$900
4. 51% of \$1,200
5. 26% of \$800
6. 32% of \$420

290 people work at *Marissa's Pasta & Fine Foods*

Fill in the spaces to complete these facts about Marissa's staff.



7. 27% had worked there for more than 2 years. This is people.
8. 31% of them have small children. This is people with small children.
9. 13% said they needed to work part-time. people need to work part-time.
10. 76% said they like working at Marissa's. This was people.

