# Shortcut Percentages:
## 50%, 25% & 75%

## Overview

This activity explores how knowing that 50% = ½ and 25% = ¼ gives us the power to do shortcut percentage calculations without formulas.

This activity ideally follows the Matching Percentages activity.

## Skills and Knowledge

- Shortcut calculations of 50% & 25% by halving
- Shortcut calculations of 75% by halving & adding

## Preparation and Materials

- Photocopy *Large 100 square grid* [See *Matching Percentages:* Activity Sheet 2 (1 - 2 for teacher demonstration)
- Photocopy Practice Sheets 1, 2 and 3 (1 per student)

## Suggested Procedure

If you are doing this activity soon after the Matching Percentages activity then students will have discussed the links between the common fractions ½, ¼, ¾ and percentages. If not you may have to spend a little more time on the introduction to this activity. The Activity Sheet would be useful.

Explain that it is useful to know these equal fractions and percentages because it helps us work out some percentage very easily without formulas or calculators.

**Calculating 50% by Halving**

Ask:

- *What fraction is the same as 50%*
- *Who knows how you could find 50% easily?*
  [It's the same as a half so you halve it]

- *For example 50% of $40*

> *50% = $\frac{1}{2}$*
> *So 50% of 40 → $\frac{1}{2}$ of $40 →$20*

- *Try the examples: 50% of $60; $28; $9; $35*
  [Answers: $30; $14; $4.50 $17.50]

[You may need to give some students further practice at halving, particularly odd numbers, see Activity]

**Calculating 25% by halving again**

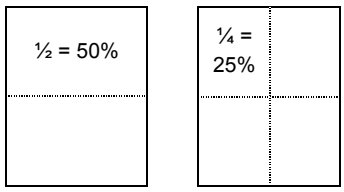
Explain:

- *We are now going to calculate 25% almost as easily as 50%*

Hold up a piece of paper and fold it in half.

Ask:

- *What fraction is this?*
- *What percentage?*




Now fold it again:

- *What fraction is this?*
- *What percentage?*

Hold up one of the 'Large 100 square grids' with one corner coloured to reinforce, or remind students, that one quarter is 25 squares out of 100.

Hopefully students will see that ¼ is obtained by halving the ½ and also that ¼ is 25%.

- *So how can we use this to find 25% of $80?*

| *First halve it* | | *Then halve again* |
|---|---|---|
| *½ of $80 = $40* | → | *½ of $40 = $20* |
| *So 25% of $80 is $20* | | |

Further examples to try before attempting the practice sheet are:

*25% of: $40; $48; $60; $100; $300*

[Answers: $10; $12; $15; $25; $75]

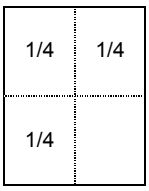
Further examples of this type are provided in Practice Sheet 1 & 2.

*Note: Some students will readily see that these can be done by dividing by four. For students who can do this competently it is a simple way to go. But students who find dividing a challenge will probably prefer this method*

**Extension - Shortcut method for 75%**

Explain to students that the quick method we have learned for 25% or ¼, can also be used to find ¾.

To reinforce the meaning of ¾ hold up the folded piece of paper you used to illustrate ¼.



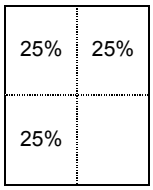
Open it out to show all of the quarters and quickly

shade three of them to indicate ¾.

Ask: *Do you remember what percentage this is?*

Indicate ¼ and remind students that this was 25%

- *So 3 of these will be 3 lots of 25% = 75%.*
  [You may have to display the paper and write 25% in each quarter to assist students to visualise this]

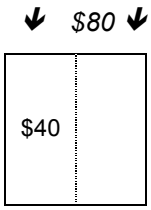



It will also be clearer with an example.

Explain that you want to find 75% of $80 without a formula.

Write $80 on top of another piece of paper, and explain:

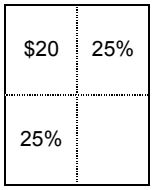
- *This piece of paper is my $80*




Fold it in half, then half again asking as you go:

- *What fraction is this?*
- *What percentage?*
- *How much money would it be?*

[First fold: ½ → 50% → $40.
Second fold: ¼ → 25% → $20]

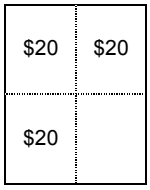



Open out the paper and, point to each of the quarters.

Ask: *How much money would this part be?*

Indicate three of the quarters. Ask:

- *How much money do we have altogether here?*
- *What did you do to get it?*
- *What percentage is this?*
- *What fraction?*




Students should realise that once they have ¼ or 25%, then to get to 75% it is a simple matter of multiplying by three, adding the amount three times or adding ½ and ¼.

75% or ¾ is 3 x $20 or $20 + $20 + $20 or $20 + $40 = $60

Ask students to work in pairs to calculate 75% of the amounts they used previously:

*75% of: $40; $48; $60; $100; $300*
[Answers: $30; $36; $45; $75; $225]

Encourage the students to draw their own diagrams or fold paper for themselves as they think about these calculations. This is far better for their understanding of the process than just remembering a rule. Also ask questions that encourage the students to explain how they understand what they are doing.

Further practice can be obtained by calculating 75% of the items on the previous Practice Sheet 2: *Shortcut calculations: 25%.*

Practice Sheet 3: *Sharing Taxis* provides further practice including some more challenging examples.

# Shortcut calculations: 50%

Practice Sheet 1


What are the discount prices for these?

Was: $450
Discount price: $ ……..

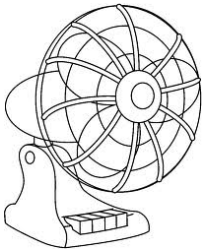
Was: $418
Discount price:
$ ……..

Were: $287
Discount price:

$ ……

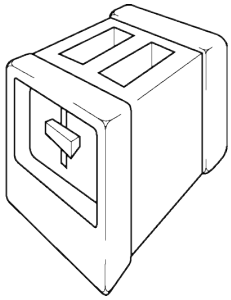
Were: $84.90
Discount price:

$ ……..



Was: $105
Discount price:

$ ……



Was $53
Discount price:

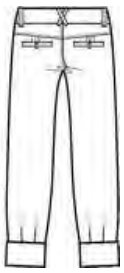
$ ……

Was: $27.30
Discount price: $ .....

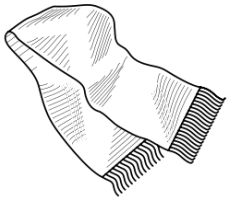
# Shortcut calculations: 25%

Practice Sheet 2

## What are the discount prices for these?

Were: $ 80
Discount: $ …….
New price: $ …….



Was: $12
Discount: $ …….:
New price: $ ……..

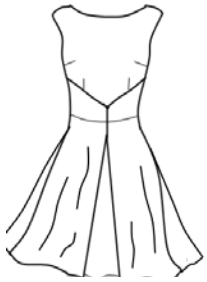
Were: $18
New price:

$ …….

Was: $84
New price: $ …….

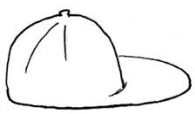
Were $112
New price:

$ …….



Was: $ 38
New price:

$ ……



Was: $17
New price: $ .....

# Sharing Taxis

Practice Sheet 3


Sometimes people have to share taxis. The law says that the first person that gets out has to pay 75% of the fare showing on the meter.

What would you pay for each of these fares?


| | |
|---|---|
| 1. $28 on the meter | 50% of fare =<br>25% of fare =<br>75% of fare = |
| 2. $36 on the meter | 50% of fare =<br>25% of fare =<br>75% of fare = |
| 3. $47 on the meter | 50% of fare =<br>25% of fare =<br>75% of fare = |
| 4. $32 on the meter | |
| 5. $ 35 on the meter | |
| 6. $24.60 on the meter | |

Some harder ones to try:

7. $18.50 8. $27.30 9. $35.70