Shortcut Percentages:
20%, 30% ... 5%

Overview

This activity extends the previous activity by exploring how the 10% shortcut can be used as a stepping stone for calculating percentages such as 20%, 30% ... as well as 5%, 15%.

Skills and Knowledge

- Shortcut calculations of 20%, 30% … based on 10%
- Shortcut calculations of 5%, 15% ... based on 10%

Preparation and Materials

A copy of the *Large 100 Square Grid* from the previous activity with each of the columns marked as 10%

Photocopy Practice Sheets 1 – 4 (1 per student)

Suggested Procedure

Revise the 10% process

Warm up with a few quick and simple 10% shortcut calculations to remind students of the skill they practised earlier, for example:

- *A shop is giving a 10% discount on all winter clothes*
- *What will they take off these prices: $40; $90; $200; $350*

[Answers: $4; $9; $20; $35 by dividing each amount by 10]

Extending the process

Explain a new scenario:

- *Winter is nearly over and the shop really wants to get rid of winter clothes, so they increase the discount to 20% of the original price*
- *Can you think of a quick way to work out 20% of these prices?*

Hopefully students can see readily that 20% is twice as much as, or double 10%. If not, use copies of the *Large 100 square grid* and ask learners to show you 10% then 20% so that they can see 20% as twice the size of 10%.

So for $40:	*10% was $4*
	20% → 2 x 10% → 2 x $4 → $8
OR	*20% → 10% + 10% → $4 + $4 → $8*

Ask students to calculate 20% of the other prices above.

Now suggest a few more scenarios and ask students to calculate the reductions for 30% or 40% of the marked price.

Try a couple more examples using different prices and percentages.

Encourage students to try using these short cut methods rather than just reverting to formulae that they may have learned in the past, or to their calculators.

Note: What students may find difficult is remembering the two steps in the process. You can 'scaffold' this by at first providing a cue for the 10% which you gradually remove as they become confident. Encourage quick jotting calculations rather than formal layout.

For example: 30% of $120: 10% = 30% =

Further quick examples are provided in Practice Sheets 1 & 2.

Sometimes adult students are resistant to learning alternative methods because they are proud of being able to use the formula. It is important that they are reminded that shortcuts can be a very useful adult tool and much quicker than formulae, especially if they want quick approximations.

Choosing the fastest method

Note: one of the last questions in the set asks for 50% of ...?

Ask students:

- *How did you calculate 50% of...?*
- *Did anyone remember the other shortcut for 50%?*
- *How can you work it out?*
- *Would it have been easier to halve the ... than to do the two steps?*

Calculating 5%

Present a scenario involving 5% calculations.

For example:

- *Farmers say that because of petrol price increases they have to increase all their wholesale prices by 5%*
- *Can you think of a quick way to calculate 5%?*
- *For example, 5% of $60?*

Encourage students to see that 5% is half of 10% so again it is a two step process of finding 10% then halving the result.

$60: 10% = $6 → 5% is half of $6 = $3

Try a few more examples together, for example:

5% of: $240; $600; $70; $190

Continue to remind students to use the short cut methods for these exercises.

Further practice is provided in Practice Sheet 3.

Calculating 15%

Now ask students:

- *Can think of a quick way to work out 15%?*
- *For example, 15% interest on a loan of $400?*

Encourage students to see that 15 can be broken in to two parts: 10 and 5.

So 15% is just 10% and 5% added together.

15% of $400:
10% → $400 ÷ 10 → $40
5% → half of $40 → $20
15% → $40 + $20 → $60

Note
The figures have been kept relatively simple in the early practice sheets so that students become confident with the methods without being bogged down with trickier divisions.

Further practice is provided in *Practice Sheet 4*.

30% off everything!!!

Calculate the prices after the discount:

Was $6 Discount: …… New price: …… 	 Was $9 Discount …… New price: ……
Was $7 Discount: …… New price: …… 	 Was $11 New price: ……
 Was $9.50 New price: ……	 Was $10.50 New price: ……

Shortcut Percentages: 20%, 30% ... 5% Practice Sheet 2

From the money we pay for electricity:

- 20% pays for generating the electricity
- 20% pays for energy saving programs
- About 50% pays for the network (the poles and wires)
- About 10 % pays for the carbon price

Ani's electricity bill is $320.	Kim's electricity bill is $490.
That means:	That means:
$ …….. pays for generating the electricity	$ …….. pays for generating the electricity
$ …….. pays for energy saving programs	$ …….. pays for energy saving programs
About $ ……..…. pays for the network	About $ ……..... pays for the network
About $ ……..…. pays for the carbon price.	About $ ..…….. pays for the carbon price

Fill in the spaces below:

260 people work at a car making factory.

- 10% of them own a car less than 2 years old.
  ……..…. workers own a car less than 2 years old.

- 50% have children at the local primary school.
  ……..…. workers have children at the local primary school.

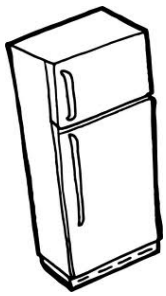
- 30% of the workers were born in Europe.
  ……..…. workers were born in Europe.

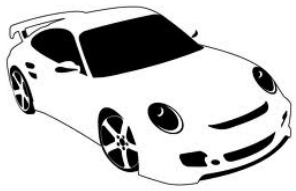
- 20% of the workers were born in Australia.
  ……..…. workers were born in Australia.

- 90% of the workers said they liked the canteen food.
  ……..…. workers liked the canteen food.

At the local homewares store the staff get a 5% discount.

Calculate the staff discount for each of these items. Then work out the final price they would pay.

 Normal price: $40 Staff discount: ……. Final price: …….	 Normal price: $480 Staff discount: ……. Final price: …….
 Normal price: $660 ……. Final price: …….	 Normal price: $270 ……. Final price: …….
 Normal price: $30 Final price: …….	 Normal price: $350 Final price: …….



1. Elisa wants to buy her first car.
It costs $3,800

She pays a 10% deposit	*Deposit*:	$ .....
She borrows the rest or the money from the bank	*Loan*:	$ .....
The interest on the loan is 15% in the first year	*Interest* (1 year)	$ .....

2. Assam also borrows $6,500 with a 15% interest rate.

He pays no deposit		
The interest on the loan in the first year	*Interest*	$ .....

Quick Easy Loans is a shopfront money lender. It charges 35% on every loan.

3. For a loan of **$400** the charge would be $ .....

Total repaid = $ .....

4. For a loan of $250 the charge would be $ .....

Total repaid = $ .....

5. How much interest would Elisa pay if she borrowed her money from *Quick Easy Loans?* $ .....

6. How much interest would Assam pay if he borrowed his money from *Quick Easy Loans?* $ .....