



## Mini-task: Using a problem-solving approach

### Using a problem-solving approach

When you are working out a numerical problem, it might help to use a problem-solving approach.

You can think of the problem in several stages:

- **Making sense of the problem/situation**
- **Choosing the right calculation**
- **Making sense of the answer**
- **Checking your answer**

This learner activity makes some suggestions to help you in each of these stages.

### 1. Making sense of the problem - What does it mean?

You can use your experience of the world to help you think about the problem in practical, everyday terms. It might help to visualise the problem.

**Sometimes it may help to sketch a diagram of the situation.**

#### Example 1: Drawing a sketch to help

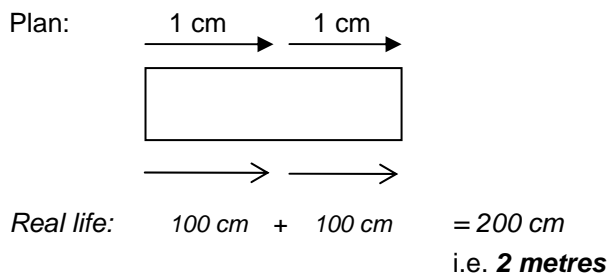
***A wardrobe is shown on a room plan as 2 cm long.***

***The scale of the plan is 1 : 100.***

***How long is the wardrobe in real life?***

For this example, drawing a sketch might help

*Each cm on the plan will be 100 cm in real life*



*If you would like more practice with this:*

*Look at the example situations in 'Mini-task: Which operation?' and think about which of the examples might be made easier by drawing a sketch.*

## 2. Choosing the right calculation:

There are several things you need to think about:

- Pick out the key information needed to work out the right calculation.  
*Sometimes you may need to ignore some information – or numbers that are not important.*
- Then decide whether to add (+), subtract (-), multiply (×) or divide (÷).

### Example 2.1

**Winston works different hours each week and is paid for the hours he has worked at £5.25 an hour. This week he worked 32 hours and earned £168. He has to pay £22 in tax and National Insurance. How much does he get in his pay packet?**

To work out how much Winston gets, only some of the numbers given are relevant:

*He earns **£168** that week.*

*He pays **£22** in tax and National Insurance. This is **taken off** his gross wage.*

*So the pay in his pay packet will be  $£168 - £22 = £146$*

Some questions might involve a calculation with more than one step:

### Example 2.2

**Maya has a budget of £100 for a meal for 5 people. She spends £13, £25 and £46. How much of her original budget has she got left?**

To work out how much Maya has left, you might work this out in two steps:

Firstly, work out how much she has spent already:

$$£13 + £25 + £46 = £84$$

Then you take this from the amount she had to start with:

$$£100 - £84 = £16$$

So she has: **£16 left**

*If you would like practice with choosing the right calculation, 'Mini-task: Which operation?' looks at:*

- *Changing questions in words into calculations*
- *Thinking about key words and phrases that give you clues about what you need to work out*
- *Picking out the information you need to answer the problem (and knowing what other information to ignore).*

### 3. Making sense of the answer – units

When you get an answer, you need to make sense of it. You can often use your experience of the real world and think ‘what does this answer mean?’.

**What *units* does the answer tell you about?**

#### Example 3

***I am saving for a night out. I put aside £9 each week. How long will it take me to save up £90 for my friend’s hen night?***

I decide that the calculation I need to work out is:	$90 \div 9$	=	10
<i>But what does this answer mean?</i>			
<i>What units is the answer in?</i>	<i>(10 whats?)</i>		
<i>In this example, it will be:</i>	<i>10 weeks</i>		

**For each of these questions, decide *which units* the answer will be in:**

- Q 3(a)** Three friends win £18 between them.  
If they share it equally, how much will they each get?
- Q 3(b)** Keith has a £10 note in his pocket. How many drinks at £1.99 can he afford?
- Q 3(c)** Someone working in an office is leaving. The other 5 people in the office decide that they want to buy her a leaving present.  
The present they have in mind costs £30. How much do each of the office mates need to contribute?
- Q 3(d)** Mac wants to put aside some money every month to pay for his car road tax.  
He needs to save up £96 over the year (12 months).  
How much should he put aside each month?
- Q 3(e)** Bags of crisps come in multi-packs of 4 bags per pack, costing 96p.  
How much is it per bag?
- Q 3(f)** Julie is putting up shelves that are 1 metre long.  
How many will she get from a piece of wood 3.6 metres long?

#### 4. Making sense of the answer – Rounding

Sometimes the answer you get can look a bit confusing at first. There might seem to be too many figures in the answer – or not enough.

##### Example 4.1

You might need to round the answer to make sense of it. This can be particularly important when you are working out calculations using a calculator.

**3 people share £10 between them. How much do they each get?**

They work out:  $£10 \div 3$  on a calculator and get the answer:

3.3333333

The answer will be in pounds.

So this shows: **3 whole pounds** and how many **pence**?  
 (before the decimal point) (after the decimal point)

Hint: The pence will be shown by the two numbers *after* the decimal point

3.33333333

Look at the *number after these two* (the 'decider')  
to help you decide if you need to round **up** or round **down**

If the next number (the 'decider') is **less than 5** round **down**

If the next number (the 'decider') is **5 or more** round **up**

*In this example:* The next number (the 'decider') is a 3.

So the amount is nearer to **£3.33** (round down)

**How much is each of these amounts when changed to money (pounds and pence)?**

For each one, you will have to decide if you need to round up or down.

**Q 4(a)** £12.379

**Q 4(b)** £1.999

**Q 4(c)** £5.942

**Q 4(d)** £4.251

**Q 4(e)** £10.8481

**Q 4(f)** £8.7175

**Q 4(g)** £9.6927

**Q 4(h)** £36.4563

### Example 4.2

**Four people need to pay a £6 taxi fare between them.**

If you work out  $£6 \div 4$  on a calculator, you get the answer:

1.5

*How much is this in pounds and pence?*

It is **£1.50**  
(but the calculator doesn't show the final 0)

*Hint: If it was one pound five pence, this would show as 1.05.*

**Work out these calculations using a calculator and make sense of the answers you get:**

- Q 4(i)** Four friends win £22 between them.  
If they share it equally, how much will they each get?
- Q 4(j)** Three people club together to buy a present for a friend.  
The present costs £16. How much does each of them need to pay?
- Q 4(k)** Luc is saving for spending money on his weekend away.  
He wants to save up £90 over the next 4 weeks.  
How much does he need to save per week?
- Q 4(l)** Packs of pizzas come in multi-packs of 3 pizzas per pack and cost £2.40.  
How much is this per pizza?
- Q 4(m)** Lily gets £25 pocket money over 8 weeks. How much is this per week?

## 5. Checking your answer

You need to think about whether the answer you've got is reasonable and can be right. There is a range of ways that you can do this, including:

- Estimating answers
- Thinking about whether your answer is reasonable
- Using 'checking back' methods

*If you would like practice with this, 'Mini-task: Which operation 2' looks at each of these in more detail.*

## Using a problem-solving approach: Answer sheet

3. The units for the answers to the calculations are:

- |               |                |   |
|---------------|----------------|---|
| <b>Q 3(a)</b> | <b>pounds</b>  | $£18 \div 3$  |
| <b>Q 3(b)</b> | <b>drinks</b>  | How many £1.99s can you get out of £10?                 |
| <b>Q 3(c)</b> | <b>pounds</b>  | $£30 \div 5$  |
| <b>Q 3(d)</b> | <b>pounds</b>  | $£96 \div 12$   |
| <b>Q 3(e)</b> | <b>pence</b>   | $96p \div 4$  |
| <b>Q 3(f)</b> | <b>shelves</b> | How many 1 metre lengths can you get out of 3.6 metres? |

4. The amounts in money are:

- |               |               |   |
|---------------|---------------|---|
| <b>Q 4(a)</b> | <b>£12.38</b> | <i>(round up – because the next number was a 9)</i>   |
| <b>Q 4(b)</b> | <b>£2.00</b>  | <i>(round up – because the next number was a 9)</i>   |
| <b>Q 4(c)</b> | <b>£5.94</b>  | <i>(round down – because the next number was a 2)</i> |
| <b>Q 4(d)</b> | <b>£4.25</b>  | <i>(round down – because the next number was a 1)</i> |

*Hint for the next four answers: Don't be distracted by any numbers after the first three from the decimal point*

- |               |               |   |
|---------------|---------------|---|
| <b>Q 4(e)</b> | <b>£10.85</b> | <i>(round up – the 'decider' was an 8)</i>  |
| <b>Q 4(f)</b> | <b>£8.72</b>  | <i>(round up – the 'decider' was a 7)</i>   |
| <b>Q 4(g)</b> | <b>£9.69</b>  | <i>(round down – the 'decider' was a 2)</i> |
| <b>Q 4(h)</b> | <b>£36.46</b> | <i>(round up – the 'decider' was a 6)</i>   |

The calculations and answers are:

	<b>Answer</b>	<b>Calculation</b>
<b>Q 4(i)</b>	£5.50	$£22 \div 4 = 5.5$
<b>Q 4(j)</b>	£5.33	$£16 \div 3 = 5.33333$
<b>Q 4(k)</b>	£22.50	$£90 \div 4 = 22.5$
<b>Q 4(l)</b>	80p	$£2.40 \div 3 = 0.8$
<b>Q 4(m)</b>	£3.13	$£25 \div 8 = 3.125$