Reasoning in the classroom

Answer 5

Support materials for teachers

Year 2

Llywodraeth Cymru
Welsh Government

Year 2 Reasoning in the classroom – Answer 5

In these Year 2 activities, learners write number sentences using different operations.

The three activities can be used as one coherent whole, as there is a clear flow from one to another, or they can be used separately.

Activity 1

Answer 5

Learners write a calculation with the answer 5.

Includes:

- Answer 5 question
- Markscheme

Activity 2

It's 5 again

They find a greater range of calculations with the answer 5, using operations of their choice.

Includes:

- Explain and question – instructions for teachers

Activity 3

How big can you go?

They choose their own ways of making 5 'grow' bigger and bigger, then bring it back down to 5.

Includes:

- Explain and question – instructions for teachers

Reasoning skills required

Identify	Communicate	Review
Learners create their own calculations, choosing numbers and operations.	They explain their reasoning and record their work.	They check each other's work.

Procedural skills

- **Addition and subtraction**
- **Multiplication and division**

Numerical language

- **Number sentence**
- **Addition and subtraction**
- **Multiplication and division**
- **Operation**
- **Bigger/smaller**

Activity 1

Answer 5

Activity 1 – Answer 5

or

Outline

This short Year 2 activity requires learners to create their own number sentence, using division, with the answer 5.

You will need

Answer 5 question
Half a page for each learner

Markscheme

This number sentence uses **+**

3 + 2 = 5

Write a number sentence using **÷**

The answer must be **5**

= 5

2m

This number sentence uses **+**

3 + 2 = 5

Write a number sentence using **÷**

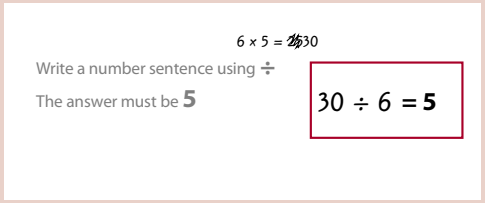
The answer must be **5**

= 5

2m

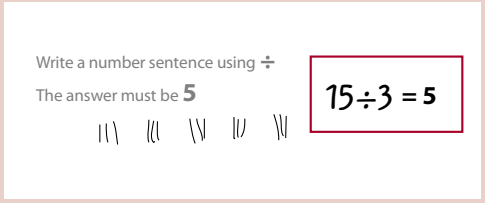
Activity 1 – Answer 5 – Markscheme and exemplars

Marks	Answer
2m	Writes a correct division, e.g. • 50 ÷ 10 = 5 • 5 ÷ 1 = 5
Or 1m	The only error is to reverse the numbers, e.g. • 10 ÷ 50 = 5



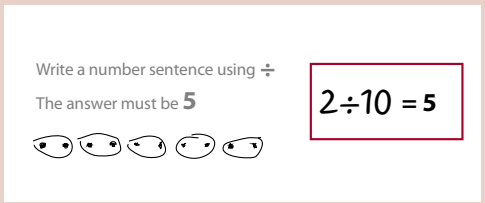
Correct; **2 marks**

- This learner understands the relationship between multiplication and division. They use a known fact (6 × 5 = 30) to work out a correct division.



Correct; **2 marks**

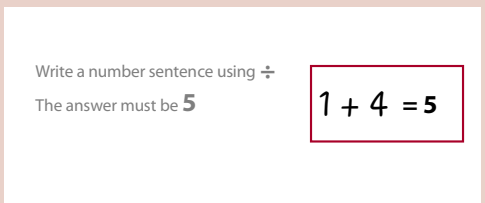
- This learner uses their understanding of division as sharing to find a correct calculation.



Correct; **1 mark**

Common error

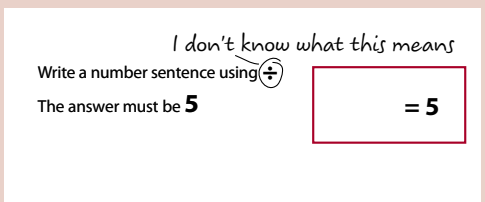
This learner also groups objects, but has written the division incorrectly.



Incorrect; **0 marks**

Common error

Understanding the difference between + and ÷ is an important numerical skill.



Incorrect; **0 marks**

Common error

Learning division at the same time as multiplication helps learners understand the relationship between the two operations.

Activity 2

It’s 5 again

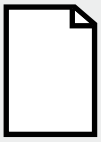
Activity 2 – It's 5 again

Outline

It's 5 again builds on and could follow immediately on from **Activity 1 – Answer 5**. However, it could be delivered as a stand-alone activity.

Learners identify as many ways as they can of arriving at the solution 5.

You will need



For each pair/group
A large sheet of paper (A3)

Activity 2 – It's 5 again

Explain

Give each pair/group a sheet of A3 paper and ask them to draw a cloud/star/any shape they like in the middle and insert a large '5'.

Ask them to write down three different number sentences that all give the answer 5 – they can choose whatever numbers and operators they like, so long as the answer is 5.

Discuss outcomes, then tell them that their task is to create as many number sentences as they can that give the answer 5 and write them on their sheet. Say that you would like them to use interesting/varied number sentences, using all four operations, i.e. addition, subtraction, multiplication and division.

Agree a time limit, e.g. 10 minutes. Then pairs/groups can swap work and 'mark' each other's work, giving feedback.

Or

Differentiate by imposing constraints, e.g. you must use more than two numbers, or in each calculation, one number must be greater than 10.

Question

- Have you checked your number sentences to make sure they do give the answer 5?
- What operators have you used? Could you use others, e.g. multiply, or . . . ?
- Which operator do you think is the easiest? Why? Which do you think is the hardest? Why?
- Does the order of your numbers matter? *(With addition or multiplication, no; with division and subtraction, yes)*
- If you had had longer to work, could you have found more number sentences that give the answer 5? If you had had all day, would you have been able to find all the number sentences that give the answer 5? Why not? *(There is an infinite, i.e. never-ending, number.)*

Activity 3

How big can you go?

Activity 3 – How big can you go?

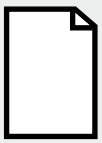
Outline

This activity flows naturally from both **Activity 1 – Answer 5** and **Activity 2 – It's 5 again**. However, it could be delivered as a stand-alone activity.

Learners devise their own calculations to make 5 into the greatest number they can before bringing it back down to 5.

To allow discussion and practical support, this activity is best undertaken in small groups with you, or another adult, present.

You will need



For each pair/group
A large sheet of paper on which to record their calculations

Calculators

Activity 3 – How big can you go?

Explain

Start by asking learners how they could make 5 grow to 6 *(add 1)*. Ask them to write 5 + 1 = 6 on their sheet. Now ask how they can make it bigger again. They record the calculation on their sheet, under the previous one.

How could they make it bigger again? And again, and again . . . until it is as big as they think they can (or want) to go. Remind them to write each calculation on their sheet, in order.

Support *(using the questions below)*, but allow them to make their own decisions – the point of this activity is to empower learners by 'taking control' of numerical manipulation. If they want to use numbers such as a thousand, help them to enter the number on the calculator – it is far less important for them to recognise that a thousand is represented by 1000 than to experience the use of large numbers themselves.

Discuss *(in very general terms)* how much bigger their number is now *(learners often get very excited by this activity!)*. Then tell them they need to bring their 'big' number all the way back down to 5 again.

Question

- How are you going to make your number bigger? How else could you make it bigger? *(Add larger numbers, or use multiplication.)*
- How could you make your number bigger without using addition? *(Multiplication by a number greater than 1)*
- What is the biggest number you know? Could it be made bigger? *(Add one and so on.)*
- If you start with 5 and you add 3, how can you go back to 5? *(Subtract 3.)* What if you start with 5 and you multiply by 3? *(Divide by 3.)*
- Why did you decide to stop at XXX *(their 'biggest' number)*? *(Gives insight into their understanding of size of number, and also their confidence, but make sure not to imply there is any right or wrong stopping point.)*
- How are you making your number smaller? How else could you make it smaller? *(Subtract larger numbers, or use division. However, division may result in an answer that is not a whole number, so if necessary help them to go back to their previous answer by multiplying by the same number that they used for the division.)*
- Can you think of a really quick way of making your number go back down to 5? *(Subtract 5 less than their total.)*

Extension

- Repeat the activity, but this time making the 5 smaller and smaller before bringing it back to 5 *(encourages the use of numbers that are not whole numbers)*.