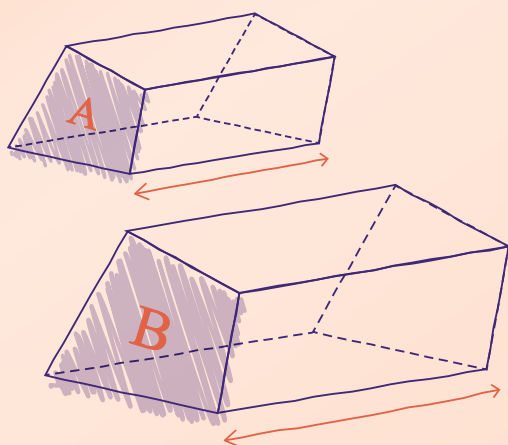


# GCSE Maths Focus on:

## Ratio

Build on your students' assessment performance using our self-guided, modular training pack



$$A:B=4:9$$

Handouts  
booklet





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# Introduction to the ‘intelligent practice’ approaches

## Intelligent Variation (Reflect, Expect, Check)

This is an approach to writing sequences of questions with care, so that each question is related to the one that precedes it, as opposed to being a random collection of questions on a topic.

Because of this relationship, students are able to form expectations of a result before carrying out the procedure, leading them to engage more actively when working through an exercise. It also allows them to think more deeply about the processes involved. To find out more about creating sequences of questions with variation and how to use them in the classroom, visit

[variationtheory.com](http://variationtheory.com)

## Same Surface, Different Deep (‘ssdd’) problems

Students are often presented with a series of problems based on the same topic, but set in different contexts. Same Surface, Different Deep (‘ssdd’) problems take a different approach by presenting problems that appear similar at first glance (same surface) but have a different underlying structure (different deep). Students are challenged to engage in the problems and recognise how they are different and what mathematics needs to be applied to solve each one. To find out more about creating and using ‘ssdd’ problems, visit [ssddproblems.com/about-the-site](http://ssddproblems.com/about-the-site)

## ‘Goal-free’ problems

This approach removes the goal or specific question from a problem and replaces it with a much more open question such as ‘find out everything you can’. This stops students fixating on the end-point and frees them to explore all the maths within the situation. Longer, previous GCSE Maths exam questions provide excellent source material for Goal-free problems and some teachers use mock exam papers derived entirely of Goal-free questions with their students. For more explanation and examples, visit [goalfreeproblems.blogspot.com](http://goalfreeproblems.blogspot.com)

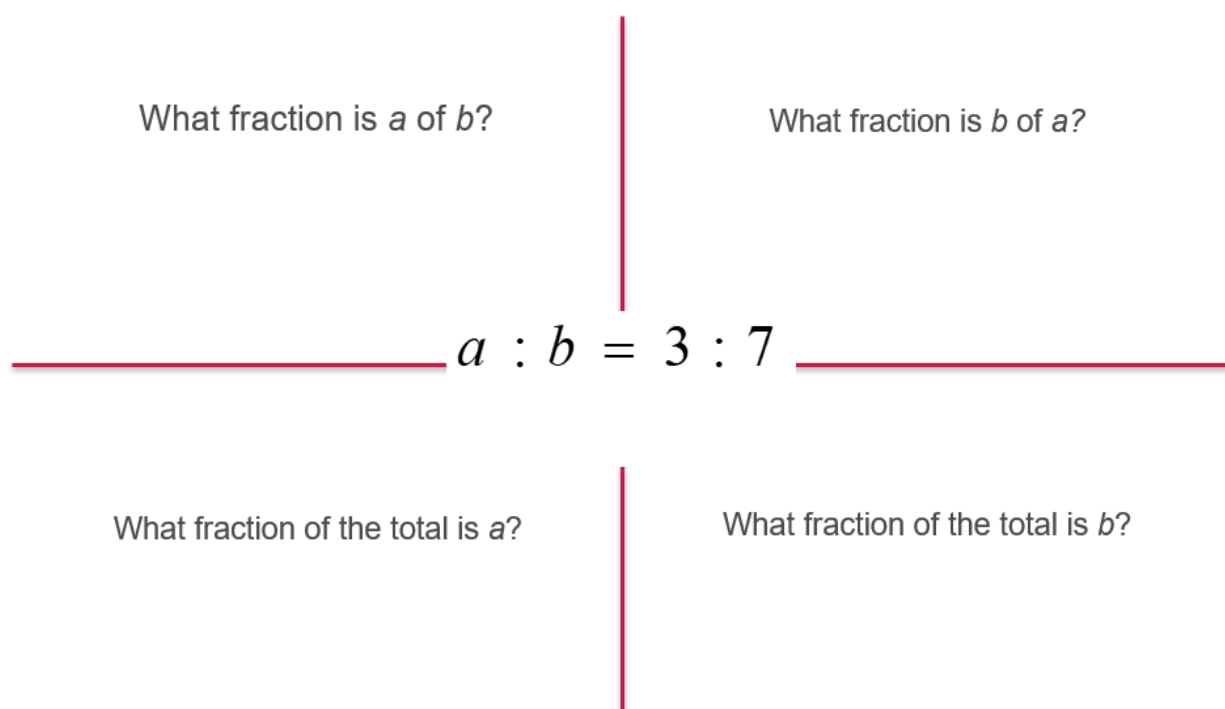
# Activity 1c: 'ssdd' examples

## Same Surface, Different Deep ('ssdd') problems

Students are often presented with a series of problems based on the same topic, but set in different contexts. Same Surface, Different Deep ('ssdd') problems take a different approach by presenting problems that appear similar at first glance (same surface) but have a different underlying structure (different deep). Students are challenged to engage in the problems and recognise how they are different and what mathematics needs to be applied to solve each one.

Examples and definitions have been provided by Craig Barton. The examples below have been extracted from [ssddproblems.com](https://ssddproblems.com)

### Example 1



## Example 2

If  $a=15$ , what is  $b$ ?

Write in the form  $1:n$

$$a : b = 3 : 7$$

Write in the form  $n:1$

How many times bigger  
than  $a$  is  $b$ ?

# Activity 2a: Combining ratios

## Combining ratios

1. The ratio of  $a : b$  is  $1 : 2$   
The ratio of  $b : c$  is  $2 : 3$   
What is the ratio of  $a : c$ ?
2. The ratio of  $a : b$  is  $1 : 2$   
The ratio of  $b : c$  is  $2 : 4$   
What is the ratio of  $a : c$ ?
3. The ratio of  $a : b$  is  $3 : 2$   
The ratio of  $b : c$  is  $2 : 4$   
What is the ratio of  $a : c$ ?
4. The ratio of  $a : b$  is  $4 : 2$   
The ratio of  $b : c$  is  $2 : 3$   
What is the ratio of  $a : c$ ?
5. The ratio of  $a : b$  is  $4 : 1$   
The ratio of  $b : c$  is  $1 : 3$   
What is the ratio of  $a : c$ ?
6. The ratio of  $a : b$  is  $4 : 6$   
The ratio of  $b : c$  is  $6 : 3$   
What is the ratio of  $a : c$ ?
7. The ratio of  $a : b$  is  $4 : 3$   
The ratio of  $b : c$  is  $6 : 3$   
What is the ratio of  $a : c$ ?
8. The ratio of  $a : b$  is  $4 : 2$   
The ratio of  $b : c$  is  $6 : 3$   
What is the ratio of  $a : c$ ?
9. The ratio of  $a : b$  is  $4 : 1$   
The ratio of  $b : c$  is  $6 : 3$   
What is the ratio of  $a : c$ ?
10. The ratio of  $a : b$  is  $4 : 1$   
The ratio of  $b : c$  is  $5 : 3$   
What is the ratio of  $a : c$ ?
11. The ratio of  $a : b$  is  $4 : 2$   
The ratio of  $b : c$  is  $5 : 3$   
What is the ratio of  $a : c$ ?
12. The ratio of  $a : b$  is  $4 : 3$   
The ratio of  $b : c$  is  $5 : 3$   
What is the ratio of  $a : c$ ?
13. The ratio of  $a : b$  is  $4 : 6$   
The ratio of  $b : c$  is  $10 : 3$   
What is the ratio of  $a : c$ ?
14. The ratio of  $a : b$  is  $4 : 4$   
The ratio of  $b : c$  is  $10 : 3$   
What is the ratio of  $a : c$ ?
15. The ratio of  $a : b$  is  $4 : 2$   
The ratio of  $b : c$  is  $5 : 3$   
What is the ratio of  $a : c$ ?
16. The ratio of  $a : b$  is  $3 : 2$   
The ratio of  $b : c$  is  $5 : 3$   
What is the ratio of  $a : c$ ?
17. The ratio of  $a : b$  is  $3 : 5$   
The ratio of  $b : c$  is  $2 : 3$   
What is the ratio of  $a : c$ ?
18. The ratio of  $a : b$  is  $9 : 5$   
The ratio of  $b : c$  is  $2 : 9$   
What is the ratio of  $a : c$ ?

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Write a:b:c in its simplest form

$$\begin{aligned}a:b &= 2:1 \\ b:c &= 1:3\end{aligned}$$

$$\begin{aligned}a:b &= 2:1 \\ b:c &= 3:5\end{aligned}$$

$$\begin{aligned}a:b &= 1:2 \\ b:c &= 7:3\end{aligned}$$

$$\begin{aligned}a:b &= 3:2 \\ b:c &= 2:5\end{aligned}$$

$$\begin{aligned}a:b &= 2:1 \\ b:c &= 3:5\end{aligned}$$

$$\begin{aligned}a:b &= 1:2 \\ b:c &= 1:3\end{aligned}$$

$$\begin{aligned}a:b &= 2:1 \\ b:c &= 2:3\end{aligned}$$

$$\begin{aligned}a:b &= 3:2 \\ b:c &= 4:3\end{aligned}$$

$$\begin{aligned}a:b &= 5:3 \\ b:c &= 2:3\end{aligned}$$

$$\begin{aligned}a:b &= 3:2 \\ b:c &= 4:5\end{aligned}$$

$$\begin{aligned}a:b &= 3:2 \\ b:c &= 6:1\end{aligned}$$

$$\begin{aligned}a:b &= 1:2 \\ b:c &= 5:3\end{aligned}$$



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Write the ratio  $a:b:c$  in the form  $1:m:n$

$$\begin{aligned} a:b &= 2:1 \\ b:c &= 1:3 \end{aligned}$$

$$\begin{aligned} a:b &= 2:1 \\ b:c &= 3:5 \end{aligned}$$

$$\begin{aligned} a:b &= 1:2 \\ b:c &= 7:3 \end{aligned}$$

$$\begin{aligned} a:b &= 3:2 \\ b:c &= 2:5 \end{aligned}$$

$$\begin{aligned} a:b &= 2:1 \\ b:c &= 3:5 \end{aligned}$$

$$\begin{aligned} a:b &= 1:2 \\ b:c &= 1:3 \end{aligned}$$

$$\begin{aligned} a:b &= 2:1 \\ b:c &= 2:3 \end{aligned}$$

$$\begin{aligned} a:b &= 3:2 \\ b:c &= 4:3 \end{aligned}$$

$$\begin{aligned} a:b &= 5:3 \\ b:c &= 2:3 \end{aligned}$$

$$\begin{aligned} a:b &= 3:2 \\ b:c &= 4:5 \end{aligned}$$

$$\begin{aligned} a:b &= 3:2 \\ b:c &= 6:1 \end{aligned}$$

$$\begin{aligned} a:b &= 1:2 \\ b:c &= 5:3 \end{aligned}$$

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# Activity 4b: Dividing quantities in a given ratio

## Variation exercise 1

1. Kate and Jack share 24 sweets in the ratio 1 : 2  
How many sweets does Kate get?
2. Kate and Jack share 24 sweets in the ratio 1 : 3  
How many sweets does Kate get?
3. Kate and Jack share 24 sweets in the ratio 3 : 1  
How many sweets does Kate get?
4. Kate and Jack share 24 sweets in the ratio 6 : 2  
How many sweets does Kate get?
5. Kate and Jack share 12 sweets in the ratio 3 : 1  
How many sweets does Kate get?
6. Kate and Jack share some sweets in the ratio 3 : 1  
Jack gets 12. How many does Kate get?
7. Kate and Jack share some sweets in the ratio 3 : 1  
Kate gets 12. How many does Jack get?
8. Kate and Jack share some sweets in the ratio 3 : 1  
Kate gets 12 more than Jack. How many does Jack get?
9. Kate and Jack share some sweets in the ratio 4 : 1  
Kate gets 12 more than Jack. How many does Jack get?
10. Kate and Jack share some sweets in the ratio 4 : 1  
Kate gets 15 more than Jack. How many does Jack get?
11. Kate and Jack share some sweets in the ratio 4 : 1  
Jack gets 15. How many sweets do they have altogether?
12. Kate and Jack share some sweets in the ratio 4 : 1  
What fraction of the sweets does Jack have?

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## Variation exercise 2

There are yellow and green counters in a bag in the ratio 3:8. There are 9 yellow counters. How many green counters are in the bag?

There are yellow, green and blue counters in a bag in the ratio 3:7:1. There are 14 green counters. How many **more** yellow than blue counters are there?

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There are 264 yellow and green counters in a bag in the ratio 3:8. How many counters are **green**?

There are yellow, green and blue counters in a bag in the ratio 3:7:1. There are 20 **more** green counters than yellow counters. How many counters are there in total?

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## Notes

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