

# Reasoning and Problem Solving

## Step 2: Making the Whole

### National Curriculum Objectives:

Mathematics Year 3: (3F1b) [Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators](#)

Mathematics Year 3: (3F1c) [Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators](#)

### Differentiation:

Questions 1, 4 and 7 (Problem Solving)

**Developing** Find the combinations of fractions that will make a given whole. Using thirds and quarters only.

**Expected** Find the combinations of fractions that will make a given whole.

**Greater Depth** Find the combinations of fractions that will make a given whole. Includes adding three fractions.

Questions 2, 5 and 8 (Reasoning)

**Developing** Explain which group is the odd one out when making a whole. Using halves, thirds and quarters only. Each group includes two representations.

**Expected** Explain which group is the odd one out when making a whole. Each group includes two representations.

**Greater Depth** Explain which group is the odd one out when making a whole. Each group includes three representations, with a mix of fractions and images.

Questions 3, 6 and 9 (Reasoning)

**Developing** Explain if the statement is correct when making a whole. Using thirds and quarters only with representations provided.

**Expected** Explain which statement is correct when making a whole. Includes missing numerators.

**Greater Depth** Explain which statement is correct when making a whole. Includes missing numerators and denominators of three fractions.

More [Year 3 Fractions](#) resources.

Did you like this resource? Don't forget to [review](#) it on our website.

## Making the Whole

1a. Pippa and Chen are sharing pencils.

Together they have shared  $\frac{4}{4}$  of the pencils.



How many pencils could Pippa and Chen have each had?

Show all the combinations.



PS

## Making the Whole

1b. Iqra and Will are sharing cupcakes.

Together they have eaten  $\frac{3}{3}$  of the cupcakes.



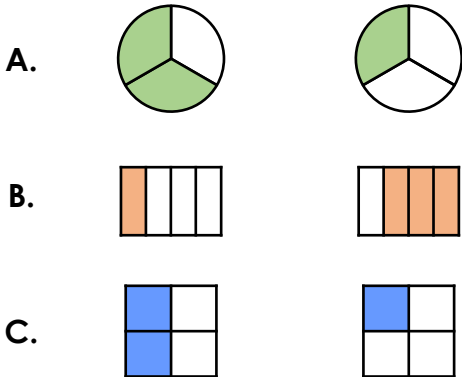
How many cupcakes could Iqra and Will have each eaten?

Show all the combinations.



PS

2a. Which pair of shapes is the odd one out?

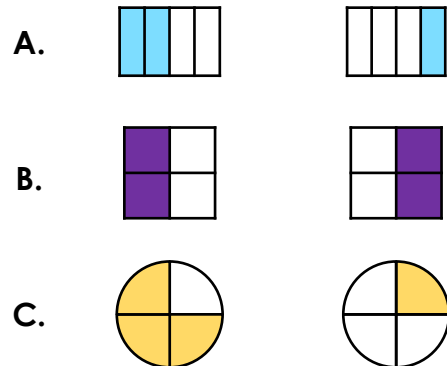


Explain your answer.



R

2b. Which pair of shapes is the odd one out?

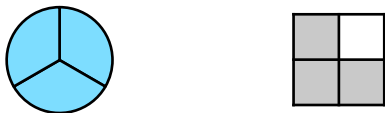


Explain your answer.



R

3a. Adam says,



$\frac{3}{3}$  and  $\frac{3}{4}$  are equal to one whole because they both have 3 as a numerator.

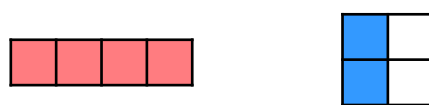


Is he correct? Convince me.



R

3b. Khadija says,



$\frac{4}{4}$  and  $\frac{2}{4}$  are equal to a whole because they both have 4 as a denominator.



Is she correct? Convince me.



R

## Making the Whole

4a. Ivy and Toby are sharing a chocolate bar.

Together they have eaten  $\frac{6}{6}$  of the chocolate bar.



How many pieces could Ivy and Toby have each eaten?

Show all the combinations.



PS

## Making the Whole

4b. Evan and Millie are sharing cookies.

Together they have eaten  $\frac{7}{7}$  of the cookies.



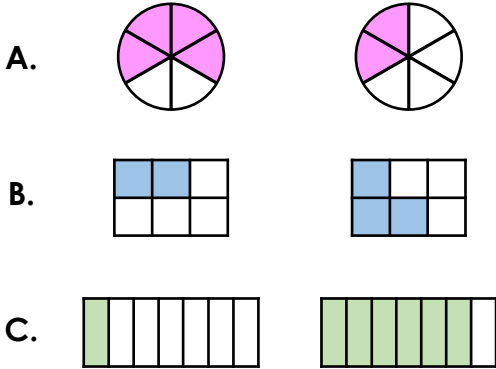
How many cookies could Evan and Millie have each eaten?

Show all the combinations.



PS

5a. Which pair of shapes is the odd one out?

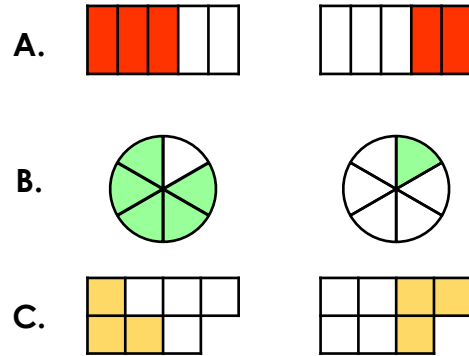


Explain your answer.



R

5b. Which pair of shapes is the odd one out?



Explain your answer.



R

6a. Sally and Peter are discussing the statement below.

$$\frac{?}{6} + \frac{?}{6} = \frac{6}{6}$$



Sally

I think that the missing numerators can only be even.

I think the numerators can be no greater than 5.



Peter

Who is correct? Convince me.



R

6b. Nasir and Evie are discussing the statement below.

$$\frac{?}{7} + \frac{?}{7} = \frac{7}{7}$$



Nasir

I think all the missing numbers are odd.

I think the numerators are greater than 0 but less than 7.



Evie

Who is correct? Convince me.



R

## Making the Whole

7a. Max, Ali and Tiana are sharing some sweets.

Together they have eaten  $\frac{9}{9}$  of the sweets.

How many sweets could Max, Ali and Tiana have each eaten?

Show six combinations.



PS

## Making the Whole

7b. Jay, Mia and Salik are sharing strawberries.

Together they have eaten  $\frac{8}{8}$  of the strawberries.

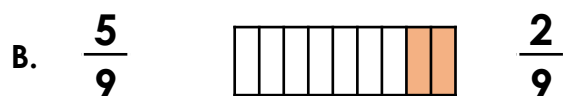
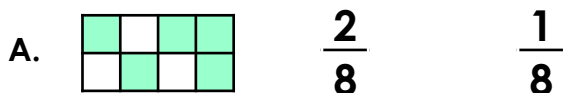
How many strawberries could Jay, Mia and Salik have each eaten?

Show six combinations.



PS

8a. Which group is the odd one out?

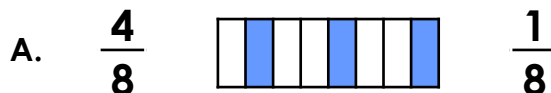


Explain your answer.



R

8b. Which group is the odd one out?



Explain your answer.



R

9a. Cami and Andy are discussing the statement below.

$$\frac{?}{?} + \frac{1}{?} + \frac{3}{?} = \frac{?}{8}$$



Cami

I think to make a whole, the denominators must be 8 and one of the missing numerator must be 4. The whole is eight eighths.

I think the missing numerator is 5 and the whole is seven eighths.



Andy

Who is correct? Convince me.



R

9b. Jim and Violet are discussing the statement below.

$$\frac{?}{?} + \frac{2}{9} + \frac{1}{?} = \frac{?}{9}$$



Jim

I think the missing denominators are 9 and one of the missing numerators is 6. The whole is nine ninths.

I think the missing numerator is 5 and the whole is eight ninths.



Violet

Who is correct? Convince me.



R

## Reasoning and Problem Solving Making the Whole

### Developing

1a.

<u>Pippa</u>	<u>Chen</u>
4	0
3	1
2	2
1	3
0	4

2a. C is the odd one out because the shaded fractions do not make a whole.

3a. No, he is incorrect because  $\frac{3}{4}$  does not make a whole.

### Expected

4a.

<u>Toby</u>	<u>Ivy</u>
6	0
5	1
4	2
3	3
2	4
1	5
0	6

5a. B is the odd one out because the shaded fractions do not make a whole.

6a. Peter is correct because he has identified that the fractions can be no greater than  $\frac{6}{6}$ .

### Greater Depth

7a. Various answers, for example:

<u>Max</u>	<u>Ali</u>	<u>Tiana</u>
8	1	0
5	3	1
1	6	2
0	2	7
2	3	4
3	3	3

8a. C is the odd one out because the shaded fractions do not make a whole.

9a. Cami is correct because she has identified the correct missing numerators and denominators. The whole fraction is eight eighths.

## Reasoning and Problem Solving Making the Whole

### Developing

1b.

<u>Iqra</u>	<u>Will</u>
3	0
2	1
1	2
0	3

2b. A is the odd one out because the shaded fractions do not make a whole.

3b. No, she is incorrect because  $\frac{2}{4}$  does not make a whole.

### Expected

4b.

<u>Euan</u>	<u>Millie</u>
7	0
6	1
5	2
4	3
3	4
2	5
1	6
0	7

5b. C is the odd one out because the shaded fractions do not make a whole.

6b. Evie is correct because she has identified that the fractions can be no greater than  $\frac{7}{7}$ .

### Greater Depth

7b. Various answers, for example:

<u>Jay</u>	<u>Mia</u>	<u>Salik</u>
2	4	2
4	0	4
1	2	5
0	8	0
6	1	1
7	1	0

8b. B is the odd one out because the shaded fractions do not make a whole.

9b. Jim is correct because he has identified the correct missing numerators and denominators. The whole is nine ninths.