

# Reasoning and Problem Solving

## Step 9: Add 3 or More Fractions

### National Curriculum Objectives:

Mathematics Year 5: (5F4) [Add and subtract fractions with the same denominator and denominators that are multiples of the same number](#)

### Differentiation:

Questions 1, 4 and 7 (Reasoning)

**Developing** Add 3 fractions together where 2 denominators are the same and the other denominator is either double or half.

**Expected** Add 3 fractions together where denominators are direct multiples of each other in order to compare.

**Greater Depth** Add 3 or more fractions together where denominators are not direct multiples of each other but have a common factor in order to compare.

Questions 2, 5 and 8 (Problem Solving)

**Developing** Follow the clues to identify which 3 fractions have been added to together to total a given answer. 2 denominators are the same and the other denominator is either double or half.

**Expected** Follow the clues to identify which 3 fractions have been added to together to total a given answer. Denominators are direct multiples of each other.

**Greater Depth** Follow the clues to identify which 3 fractions have been added to together to total a given answer. Denominators are not direct multiples of each other but have a common factor.

Questions 3, 6 and 9 (Reasoning)

**Developing** Identify and explain errors when adding 3 fractions together where 2 denominators are the same and the other denominator is either double or half.

**Expected** Identify and explain errors when adding 3 or more fractions together where denominators are direct multiples of each other.

**Greater Depth** Identify and explain errors when adding 3 or more fractions together where denominators are not direct multiples of each other but have a common factor.

More [Year 5 Fractions](#) resources.

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## Add 3 or More Fractions

1a. Lola and Ricardo are adding 3 different fractions. Lola thinks her answer will be the biggest fraction.



$$\frac{1}{14} + \frac{3}{14} + \frac{3}{7}$$

Lola

$$\frac{1}{7} + \frac{4}{14} + \frac{3}{14}$$



Ricardo

Is she correct? Explain why.



R

## Add 3 or More Fractions

1b. Tara and Sam are adding 3 different fractions. Sam thinks his answer will be the biggest fraction.



$$\frac{3}{12} + \frac{2}{6} + \frac{5}{12}$$

Tara

$$\frac{1}{6} + \frac{6}{12} + \frac{3}{12}$$



Sam

Is he correct? Explain why.



R

2a. Use the clues below to work out which 3 fractions add together to total  $\frac{8}{10}$ .

- One of the fractions is  $\frac{2}{5}$ .
- The other two denominators have the same value as each other.
- The other two numerators are odd.



PS

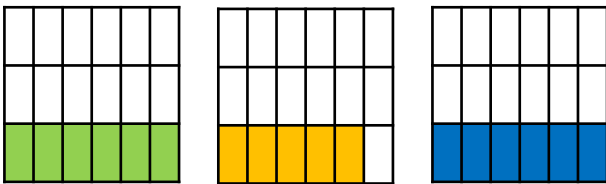
2b. Use the clues below to work out which 3 fractions add together to total  $\frac{10}{16}$ .

- One of the fractions is  $\frac{2}{8}$ .
- The other two denominators have the same value as each other.
- The other two numerators are even.



PS

3a. Martha has added three fractions based on the bar models below.



$$\frac{6}{18} + \frac{5}{18} + \frac{3}{9} = \frac{14}{18}$$

Is she correct? Prove it.



R

3b. Rick has added three fractions based on the bar model below.



$$\frac{2}{16} + \frac{4}{8} + \frac{3}{16} = \frac{13}{40}$$

Is he correct? Prove it.



R

## Add 3 or More Fractions

4a. Sue and Joe are adding 3 different fractions. Sue thinks her answer will be the biggest fraction.



Sue

$$\frac{2}{20} + \frac{3}{10} + \frac{1}{5}$$

$$\frac{6}{20} + \frac{1}{10} + \frac{2}{5}$$



Joe

Is she correct? Explain why.



R

## Add 3 or More Fractions

4b. Emmy and Tim are adding 3 different fractions. Tim thinks his answer will be the biggest fraction.



Emmy

$$\frac{2}{28} + \frac{3}{14} + \frac{1}{7}$$

$$\frac{3}{7} + \frac{1}{28} + \frac{2}{14}$$



Tim

Is he correct? Explain why.



R

5a. Use the clues below to work out which 3 fractions add together to total  $\frac{14}{18}$ .

- One of the denominators is 18. Another is half of this.
- One of the denominators is a third of 9.
- No numerator is greater than 4.
- Two of the numerators are even and one is half the size of the other.



PS

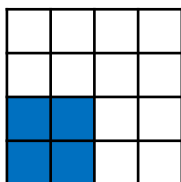
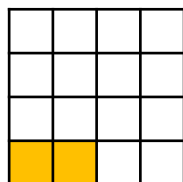
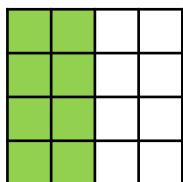
5b. Use the clues below to work out which 3 fractions add together to total  $\frac{11}{12}$ .

- One of the denominators is 12. All of the denominators are even.
- One denominator is half of the other.
- One fraction is a half.
- No numerator is greater than 2.



PS

6a. Priya has added three fractions based on the bar models below.



$$\frac{1}{2} + \frac{2}{16} + \frac{1}{4} = \frac{14}{22}$$

Is she correct? Prove it.



R

6b. Anthony has added four fractions based on the bar model below.



$$\frac{2}{6} + \frac{1}{3} + \frac{2}{12} + \frac{2}{24} = \frac{7}{24}$$

Is he correct? Prove it.



R

## Add 3 or More Fractions

7a. Jen and Todd are adding 3 different fractions. Jen thinks her answer will be the biggest fraction.



$$\frac{1}{7} + \frac{3}{28} + \frac{1}{4}$$

Jen

$$\frac{1}{14} + \frac{2}{7} + \frac{1}{2}$$



Todd

Is she correct? Explain why.



R

## Add 3 or More Fractions

7b. Rosie and Kai are adding 3 different fractions. Kai thinks his answer will be the biggest fraction.



$$\frac{2}{8} + \frac{1}{6} + \frac{3}{24}$$

Rosie

$$\frac{3}{12} + \frac{1}{3} + \frac{1}{4}$$



Kai

Is he correct? Explain why.



R

8a. Use the clues below to work out which 3 fractions add together to total  $\frac{25}{36}$ .

- One denominator is 36. Two of the denominators are less than 10 but greater than 5.
- The denominators are all different and are factors of 36.
- One of the numerators is 2.
- The other two numerators are odd.



PS

8b. Use the clues below to work out which 3 fractions add together to total  $\frac{26}{30}$ .

- One denominator is 30. One is a multiple of 5.
- One denominator can go into 30 three times.
- All of the numerators are even.
- No numerator is greater than 4.



PS

9a. Rita has added four fractions based on the bar model below.



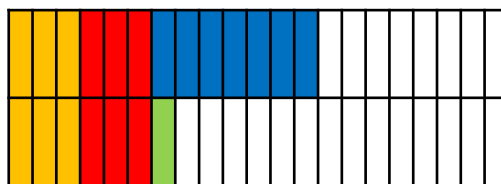
$$\frac{1}{6} + \frac{1}{3} + \frac{1}{18} + \frac{2}{9} = \frac{5}{18}$$

Is she correct? Prove it.



R

9b. Noel has added four fractions based on the bar model below.



$$\frac{1}{42} + \frac{1}{6} + \frac{3}{21} + \frac{1}{7} = \frac{20}{76}$$

Is he correct? Prove it.



R

## Reasoning and Problem Solving Add 3 or More Fractions

### Developing

1a. Lola is correct as  $\frac{10}{14}$  is more than  $\frac{9}{14}$ .

2a.  $\frac{3}{10} + \frac{1}{10} + \frac{2}{5} = \frac{8}{10}$

3a. Martha is incorrect as she needs to convert the  $\frac{3}{9}$  to  $\frac{6}{18}$ . The answer is  $\frac{17}{18}$ .

### Expected

4a. No. Joe has  $\frac{16}{20}$  which is more than  $\frac{12}{20}$ .

5a.  $\frac{4}{18} + \frac{2}{9} + \frac{1}{3} = \frac{14}{18}$

6a. Priya is incorrect as she has added the denominators. The correct answer is  $\frac{14}{16}$ .

### Greater Depth

7a. Jen is incorrect as  $\frac{14}{28}$  is less than  $\frac{12}{14}$ .

8a.  $\frac{1}{36} + \frac{3}{9} + \frac{2}{6} = \frac{25}{36}$

9a. Rita is incorrect because she's added the numerators before finding a common denominator. The correct answer is  $\frac{14}{18}$ .

## Reasoning and Problem Solving Add 3 or More Fractions

### Developing

1b. Sam is incorrect as  $\frac{11}{12}$  is less than  $\frac{12}{12}$ .

2b.  $\frac{2}{8} + \frac{2}{16} + \frac{4}{16} = \frac{10}{16}$

3b. Rick is incorrect as he has added the denominators together. The answer is  $\frac{13}{16}$ .

### Expected

4b. Tim is correct as  $\frac{17}{28}$  is more than  $\frac{12}{28}$ .

5b.  $\frac{1}{12} + \frac{2}{6} + \frac{1}{2} = \frac{11}{12}$

6b. Anthony is incorrect as he has added the numerators before converting the fractions to the same denominator. The correct answer is  $\frac{22}{24}$ .

### Greater Depth

7b. Kai is correct as  $\frac{10}{12}$  is more than  $\frac{13}{24}$ .

8b.  $\frac{2}{30} + \frac{4}{10} + \frac{2}{5} = \frac{26}{30}$

9b. Noel is incorrect as he has added the denominators. The correct answer is  $\frac{20}{42}$ .