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 Identify and explain errors when adding three fractions together where two denominators are the same and the other denominator is either double or half. Models and pictorial representations used.
Expected Identify and explain errors when adding three or more fractions together where all denominators are direct multiples of each other. Models and pictorial representations used.
Greater Depth Identify and explain errors when adding three or more fractions together where denominators are not all direct multiples of each.

Questions 2, 5 and 8 (Problem Solving)
Developing Follow the clues to identify which three fractions have been added to together to total a given fraction. Two denominators are the same and the other denominator is either double or half.
Expected Follow the clues to identify which three fractions have been added to together to total a given answer. Denominators are all direct multiples of each other.
Greater Depth Follow the clues to identify which three fractions have been added to together to total a given answer. Denominators are not all direct multiples of each other.

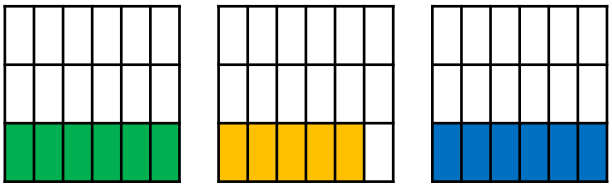
Questions 3, 6 and 9 (Reasoning)
Developing Identify whether that statement is true or false and explain why. Two denominators are the same and the other denominator is either double or half in order to compare.
Expected Identify whether that statement is true or false and explain why. Denominators are all direct multiples of each other in order to compare.
Greater Depth Identify whether that statement is true or false and explain why. Denominators are not all direct multiples of each other.

More Year 5 Fractions resources.

Did you like this resource? Don't forget to review it on our website.

Add 3 or More Fractions

1a. Martha has added three fractions based on the models below.



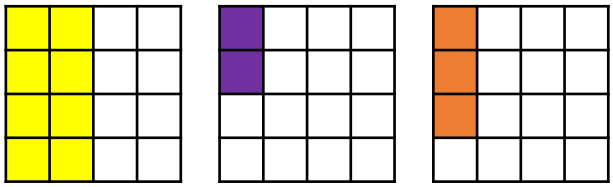
$$\frac{3}{9} + \frac{5}{18} + \frac{6}{18} = \frac{14}{18}$$

Is she correct? Prove it.

D R

Add 3 or More Fractions

1b. Rick has added three fractions based on the models below.



$$\frac{4}{8} + \frac{2}{16} + \frac{3}{16} = \frac{9}{40}$$

Is he correct? Prove it.

D 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.

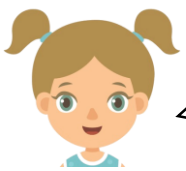
D PS

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.

D PS

3a. True or false? Lola's calculation gives the larger answer.



Lola

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

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

Ricardo

Explain your answer.

D R

3b. True or false? Sam's calculation gives the larger answer.

Tara

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

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

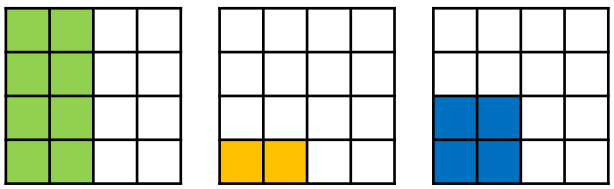
Sam

Explain your answer.

D R

Add 3 or More Fractions

4a. Priya has added three fractions based on the models below.

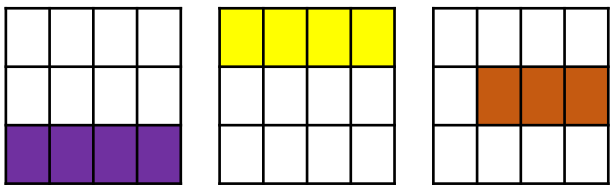


$$\frac{1}{2} + \frac{2}{16} + \frac{1}{4} = \frac{14}{22}$$

Is she correct? Prove it.

E R

4b. Tony has added three fractions based on the models below.



$$\frac{1}{3} + \frac{2}{6} + \frac{2}{12} = \frac{10}{12}$$

Is he correct? Prove it.

E 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.

E 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.

E PS

6a. True or false? Sue's calculation gives the larger answer.

Sue

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

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

Joe

Explain your answer.

E R

6b. True or false? Tim's calculation gives the larger answer?

Emmy

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

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

Tim

Explain your answer.

E R

Add 3 or More Fractions

7a. Rita solved the calculation below.

$$\frac{1}{6} + \frac{1}{3} + \frac{1}{4} + \frac{1}{9} = \frac{32}{36}$$

Is she correct? Prove it.

GD R

Add 3 or More Fractions

7b. Noel has solved the calculation below.

$$\frac{1}{14} + \frac{2}{6} + \frac{1}{2} + \frac{1}{21} = \frac{40}{42}$$

Is he correct? Prove it.

GD 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.

GD PS

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

- One denominator is 30. The others are different multiples of 5.
- One denominator can go into 30 three times.
- All of the numerators are even.
- No numerator is greater than 4.

GD PS

9a. True or false? Jen's calculation gives the larger answer.

Jen

$\frac{1}{7} + \frac{1}{6} + \frac{2}{3}$

$\frac{1}{6} + \frac{2}{7} + \frac{1}{2}$

Todd

Explain your answer.

GD R

9b. True or false? Kai's calculation gives the larger answer.

Rosie

$\frac{1}{3} + \frac{1}{6} + \frac{1}{5}$

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

Kai

Explain your answer.

GD R

Reasoning and Problem Solving
Add 3 or More Fractions

Developing

1a. Martha is incorrect because she needs to convert the $\frac{3}{9}$ to $\frac{6}{18}$. The answer is $\frac{17}{18}$.

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

3a. True because $\frac{9}{14}$ is more than $\frac{8}{14}$.

Expected

4a. Priya is incorrect because she has added the denominators. The correct answer is $\frac{14}{16}$ or $\frac{7}{8}$.

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

6a. False because $\frac{16}{20}$ is more than $\frac{12}{20}$.

Greater Depth

7a. Rita is incorrect because $\frac{1}{6} + \frac{1}{3} + \frac{1}{4} + \frac{1}{9} = \frac{31}{36}$

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

9a. True because $\frac{41}{42}$ is more than $\frac{40}{42}$.

Reasoning and Problem Solving
Add 3 or More Fractions

Developing

1b. Rick is incorrect because he has added the denominators and the numerators together. The answer is $\frac{15}{16}$.

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

3b. False because $\frac{11}{12}$ is less than $\frac{12}{12}$.

Expected

4b. Tony is incorrect because he has added $\frac{2}{12}$ but the model shows $\frac{3}{12}$ so the answer should be $\frac{11}{12}$.

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

6b. True because $\frac{17}{28}$ is more than $\frac{12}{28}$.

Greater Depth

7b. Noel is correct because $\frac{1}{14} + \frac{2}{6} + \frac{1}{2} + \frac{1}{21} = \frac{40}{42}$. He could also have given this answer as $\frac{20}{21}$.

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

9b. True because $\frac{26}{30}$ is more than $\frac{21}{30}$.