Reasoning and Problem Solving
Step 21: Four Rules with Fractions

National Curriculum Objectives:

Mathematics Year 6: (6F2) Use common factors to simplify fractions; use common multiples to express fractions in the same denomination
Mathematics Year 6: (6F4) Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
Mathematics Year 6: (6F5a) Multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, 1/4 × 1/2 = 1/8]
Mathematics Year 6: (6F5b) Divide proper fractions by whole numbers [for example, 1/3 ÷ 2 = 1/6]

Differentiation:

Questions 1, 4 and 7 (Problem Solving)
Developing Change one operation or numeral in a multi-step calculation to give a correct answer. Fractions have same denominators in each question.
Expected Change one operation or numeral in a multi-step calculation to give a correct answer. Fractions or mixed numbers have denominators that are direct multiples.
Greater Depth Change one operation or numeral in a multi-step calculation to give a correct answer. Fractions or mixed numbers have denominators that are not always direct multiples.

Questions 2, 5 and 8 (Problem Solving)
Developing Find the odd one out of three multi-step calculations involving questions where fractions have the same denominator.
Expected Find the odd one out of three multi-step calculations involving fractions or mixed numbers with different denominators.
Greater Depth Find the odd one out of three multi-step calculations involving fractions or mixed numbers with different denominators that are not always direct multiples.

Questions 3, 6 and 9 (Reasoning)
Developing Explain errors in multi-step calculations involving questions using fractions with the same denominator.
Expected Explain errors in multi-step calculations involving fractions or mixed numbers with different denominators that are direct multiples.
Greater Depth Explain errors in multi-step calculations involving fractions or mixed numbers with different denominators that are not always direct multiples.

More Year 5 and Year 6 Fractions resources.

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Four Rules with Fractions

1a. The following calculation is incorrect.

$$\frac{2}{5} + \frac{4}{5} + \frac{2}{5} = 1\frac{4}{5}$$

Change one number in the answer to make the calculation correct.

D

6 PS

Four Rules with Fractions

1b. The following calculation is incorrect.

$$\left(\frac{3}{4} - \frac{2}{4}\right) \times \frac{6}{4} = \frac{8}{16}$$

Change one number in the answer to make the calculation correct.

D

6 PS

2a. Which answer is the odd one out?

A. $\left(\frac{2}{5} + \frac{1}{5}\right) \times \frac{3}{5} = \frac{9}{25}$

B. $\left(\frac{3}{3} \times \frac{3}{3}\right) \div 2 = \frac{1}{2}$

C. $\left(\frac{10}{12} - \frac{6}{12}\right) + \frac{2}{12} = \frac{6}{12}$

D

6 PS

2b. Which answer is the odd one out?

A. $\left(\frac{4}{8} - \frac{2}{8}\right) + \frac{2}{8} = \frac{4}{8}$

B. $\left(\frac{5}{6} - \frac{1}{6}\right) - \frac{1}{6} = \frac{3}{6}$

C. $\left(\frac{3}{5} - \frac{2}{5}\right) + \frac{4}{5} = \frac{5}{5}$

D

6 PS

3a. Lottie and Rose have completed the same calculation.

Lottie

$$\left(\frac{5}{8} - \frac{2}{8}\right) \div 3 = \frac{1}{8}$$

Rose

$$\left(\frac{5}{8} - \frac{2}{8}\right) \div 3 = \frac{3}{8}$$

Who is correct? Explain any mistakes.

D

6 R

3b. Jacob and Harry have completed the same calculation.

Jacob

$$\left(\frac{1}{3} + \frac{2}{3}\right) \div 6 = \frac{1}{6}$$

Harry

$$\left(\frac{1}{3} + \frac{2}{3}\right) \div 6 = \frac{3}{6}$$

Who is correct? Explain any mistakes.

D

6 R

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Four Rules with Fractions

4a. The following calculation is incorrect.

$$\left(\frac{2}{8} + \frac{4}{8}\right) \div 3 = 2\frac{1}{4}$$

Change one operation in the calculation to make it correct.

E

6 PS

Four Rules with Fractions

4b. The following calculation is incorrect.

$$\left(\frac{3}{4} + \frac{1}{4}\right) \times \frac{4}{8} = \frac{3}{8}$$

Change one number in the calculation to make it correct.

E

6 PS

5a. Which answer is the odd one out?

A. $\left(\frac{1}{2} + \frac{3}{4}\right) \times \frac{3}{6} = \frac{15}{24}$

B. $\left(\frac{3}{8} - \frac{2}{8}\right) + \frac{4}{8} = \frac{5}{8}$

C. $\left(\frac{3}{6} + \frac{2}{6}\right) \times 2 = 1\frac{4}{6}$

E

6 PS

5b. Which answer is the odd one out?

A. $\left(\frac{2}{3} + \frac{1}{3}\right) \times \frac{1}{2} = \frac{3}{6}$

B. $\left(\frac{1}{8} + \frac{3}{8}\right) + \frac{2}{8} = \frac{3}{4}$

C. $\left(\frac{6}{12} - \frac{1}{4}\right) + \frac{3}{12} = \frac{6}{12}$

E

6 PS

6a. John and Suzie have completed the same calculation.

John

$$\left(\frac{3}{4} - \frac{1}{4}\right) \div 2 = \frac{1}{2}$$

Suzie

$$\left(\frac{3}{4} - \frac{1}{4}\right) \div 2 = \frac{1}{4}$$

Who is correct? Explain any mistakes.

E

6 R

6b. Ted and Tilly have completed the same calculation.

Ted

$$\left(\frac{3}{4} + \frac{2}{8}\right) \times 4 = 2$$

Tilly

$$\left(\frac{3}{4} + \frac{2}{8}\right) \times 4 = 4$$

Who is correct? Explain any mistakes.

E

6 R

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Four Rules with Fractions

7a. The following calculation is incorrect.

$$\left(\frac{2}{4} + \frac{2}{8}\right) \div 2 = \frac{3}{5}$$

Change <u>one</u> number or operation in the calculation to make it correct.

GD

6 PS

Four Rules with Fractions

7b. The following calculation is incorrect.

$$\left(\frac{4}{10} + \frac{1}{5}\right) \div 2 = \frac{2}{10}$$

Change <u>one</u> number or operation in the calculation to make it correct.

GD

6 PS

8a. Which calculation is the odd one out?

A. $\left(\frac{2}{3} \times \frac{1}{4}\right) \times 2 = \frac{1}{3}$

B. $\left(\frac{12}{10} - \frac{2}{5}\right) \times \frac{3}{5} = \frac{12}{25}$

C. $\left(\frac{1}{12} + \frac{3}{6}\right) - \frac{3}{12} = \frac{4}{12}$

GD

6 PS

8b. Which calculation is the odd one out?

A. $\left(\frac{6}{10} - \frac{1}{5}\right) \div 2 = \frac{1}{5}$

B. $\left(\frac{3}{4} - \frac{2}{3}\right) + \frac{5}{12} = \frac{6}{12}$

C. $\left(\frac{3}{6} - \frac{1}{3}\right) + \frac{1}{6} = \frac{3}{6}$

GD

6 PS

9a. Michelle and Peter have completed the same calculation.

Michelle

$$\left(\frac{6}{12} + \frac{2}{10}\right) \times 2 = 2\frac{2}{5}$$

Peter

$$\left(\frac{6}{12} + \frac{2}{10}\right) \times 2 = 1\frac{2}{5}$$

Who is correct? Explain any mistakes.

GD

6 R

9b. Kevin and Rob have completed the same calculation.

Kevin

$$\left(\frac{9}{12} - \frac{1}{4}\right) \times \frac{1}{3} = \frac{1}{6}$$

Rob

$$\left(\frac{9}{12} - \frac{1}{4}\right) \times \frac{1}{3} = \frac{3}{6}$$

Who is correct? Explain any mistakes.

GD

6 R

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Reasoning and Problem Solving
Four Rules with Fractions

Developing

1a. Should be $\frac{3}{5}$, not $\frac{2}{5}$.

2a. A is the odd one out because the others are equivalent.

3a. Lottie is correct. Rose wrote $\frac{3}{8}$ instead of $\frac{1}{8}$.

Expected

4a. ÷ should be changed to x to get the answer $2\frac{1}{4}$.

5a. C is the odd one out. The other two calculations equal $\frac{5}{8}$.

6a. Suzie is correct. John answered $\frac{1}{2}$ instead of $\frac{1}{4}$.

Greater Depth

7a. The correct answer is $\frac{3}{8}$.

8a. B is the odd one out because the others equal $\frac{1}{3}$.

9a. Peter is correct. Michelle worked out the improper fraction as a mixed fraction incorrectly.

Reasoning and Problem Solving
Four Rules with Fractions

Developing

1b. Should be $\frac{6}{16}$, not $\frac{8}{16}$.

2b. C is the odd one out because the others are equivalent.

3b. Jacob is correct. Harry wrote $\frac{3}{8}$ instead of $\frac{1}{8}$.

Expected

4b. It should be $\frac{2}{4}$ not $\frac{3}{4}$.

5b. B is the odd one out. The other two calculations equal $\frac{1}{2}$.

6b. Tilly is correct. Ted wrote 2 instead of 4 as his answer.

Greater Depth

7b. The correct answer is $\frac{3}{10}$.

8b. A is the odd one out because the others equal $\frac{1}{2}$.

9b. Kevin is correct. Rob has written $\frac{3}{6}$ instead of $\frac{1}{6}$.

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