THIRD SPACE LEARNING

Error Analysis

Fractions

4th Grade

Instructions

A student has been given a set of questions to answer. They tried their best but think they have got some answers wrong.
Go through the work and check the answers. Help the student understand their errors by explaining what they did wrong or how to find the correct answer (there are prompts below the questions to help you).
Note that you will not always be asked to provide the correct answer.

1 $\frac{4}{5} + \frac{6}{15} =$

$$\frac{4}{5} + \frac{6}{15} =$$

$$\downarrow \quad \downarrow$$

$$\frac{12}{15} + \frac{6}{15} = \frac{18}{15}$$

This answer is: ☐ Correct ☐ Incorrect $\frac{18}{15}$

Is there another way to write the improper fraction? Prove it.

2 Complete the equivalent fraction.

$$\frac{26}{30} = \frac{1}{5}$$

This answer is: ☐ Correct ☐ Incorrect

If incorrect, explain the error.

3 Order from smallest to largest.

$$\frac{1}{7} \quad \frac{6}{14} \quad \frac{8}{7} \quad \frac{6}{21} \quad \frac{10}{14}$$

$\frac{1}{7}$ $\frac{6}{14}$ $\frac{6}{21}$ $\frac{8}{7}$ $\frac{10}{14}$

Smallest Largest

This answer is: ☐ Correct ☐ Incorrect

If incorrect, explain how to order fractions with different denominators.

4 Convert this fraction to an improper fraction

$$7\frac{3}{12}$$

$\frac{10}{12}$

This answer is: ☐ Correct ☐ Incorrect

If incorrect, what should the correct answer be? Explain.

5 $3\frac{3}{6} - \frac{8}{12} =$

$\frac{3}{6} - \frac{8}{12} =$

↓ ↓

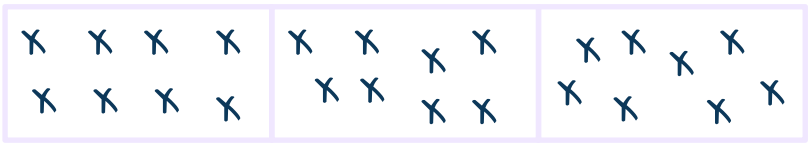
$\frac{6}{12} - \frac{8}{12} = \frac{2}{12} = \frac{1}{6}$

$3\frac{1}{6}$

This answer is: ☐ Correct ☐ Incorrect

If incorrect, explain the error.

6 $\frac{2}{3}$ of 24 =

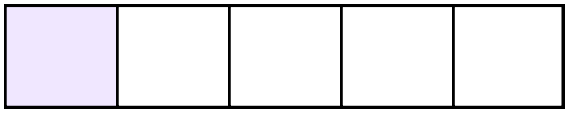


$\frac{16}{3}$

This answer is: ☐ Correct ☐ Incorrect

If incorrect, explain why the answer is incorrect.

7 Use the bar model to complete the calculation.



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

This answer is: ☐ Correct ☐ Incorrect

What are the numerator and denominator?

8 $\frac{2}{7} + \frac{3}{7} =$

$\frac{5}{14}$

This answer is: ☐ Correct ☐ Incorrect

Prove the answer is correct or incorrect.

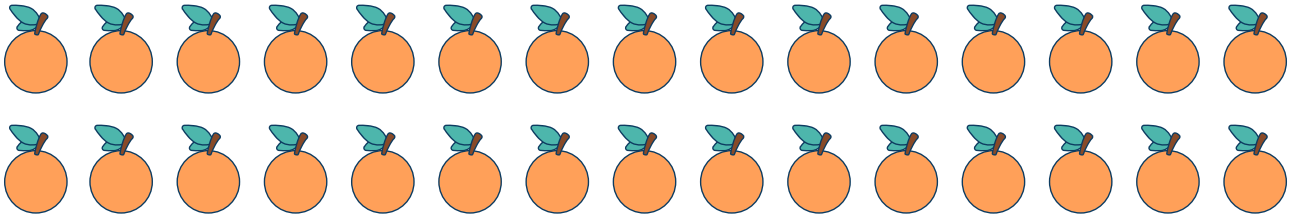
9 $\frac{7}{9} - \frac{3}{9} =$

$\frac{6}{9}$

This answer is: ☐ Correct ☐ Incorrect

Explain how you would complete the calculation.

10 Find $\frac{1}{5}$ of the oranges.



15

This answer is: ☐ Correct ☐ Incorrect

Explain how to find $\frac{1}{5}$ of the oranges.

Answers

Question Number	Question	Answer
1	$\frac{4}{5} + \frac{6}{15} = \frac{18}{15}$ Is there another way to write the improper fraction? Prove it.	Correct The improper fraction can be simplified by dividing both the numerator and the denominator by 3. $\frac{6}{5}$
2	Complete the equivalent fraction. $\frac{\quad}{30} = \frac{1}{5}$ Given answer: 26 If incorrect, explain the error.	Incorrect The answer shows a misunderstanding of equivalent fractions. The answer has been found by finding the difference between 30 and 5 and applying the same difference to the missing number and 1. Correct answer: 6 Students need to understand that multiplication can be used to find equivalent fractions, not addition.
3	Order the fractions. Given answer: $\frac{1}{7}$ $\frac{6}{14}$ $\frac{6}{21}$ $\frac{8}{7}$ $\frac{10}{14}$ If incorrect, explain how to order fractions with different denominators.	Incorrect The fractions have been ordered according to the numerator. To order fractions with different denominators, students should find a common denominator then compare the numerators. $\frac{1}{7} = \frac{2}{14}$ $\frac{6}{14} = \frac{6}{14}$ $\frac{8}{7} = \frac{16}{14}$ $\frac{6}{21} = \frac{4}{14}$ $\frac{10}{14} = \frac{10}{14}$ Correct answer: $\frac{1}{7}$ $\frac{6}{21}$ $\frac{6}{14}$ $\frac{10}{14}$ $\frac{8}{7}$

Question Number	Question	Answer
4	Convert this fraction to an improper fraction $7\frac{3}{12}$ Given answer: $\frac{10}{12}$ If incorrect, what should the correct answer be? Explain.	Incorrect Misunderstanding of what a whole means within a mixed number. The answer shows the misunderstanding that the whole means 1 whole, regardless of the actual number of wholes. $7 = \frac{7}{1} = \frac{84}{12}$ $\frac{84}{12} + \frac{3}{12} = \frac{87}{12}$ Correct answer: $\frac{87}{12}$
5	$3\frac{3}{6} - \frac{8}{12} =$ Given answer: $3\frac{1}{6}$ If incorrect, explain the error.	Incorrect Misunderstanding of how to subtract a fraction from a mixed number. The student's work shows that an accurate equivalent fraction has been found for $\frac{3}{6}$. The confusion has come from $\frac{6}{12}$ being smaller than $\frac{8}{12}$. Students could convert $3\frac{6}{12}$ to an improper fraction before subtracting $\frac{8}{12}$. Correct answer: $2\frac{10}{12}$ or $2\frac{5}{6}$
6	$\frac{2}{3}$ of 24 = Given answer: $\frac{16}{3}$ If incorrect, explain why the answer is incorrect.	Incorrect The diagram shows an understanding of how to find a non-unit fraction of 24. 24 shared into 3 parts gives 8 in each part. Two of these parts would equal 16. Correct answer: 16 Some pupils find it difficult to understand why a question containing a fraction does not have a fraction as an answer. Concrete resources can be used to develop this understanding.

Question Number	Question	Answer
7	Use the bar model to complete the calculation. $\frac{1}{5}$ + ... = 1 Given answer: $\frac{4}{5}$ What are the numerator and denominator?	Correct The denominator is the bottom number of a fraction and represents the number of parts the whole is shared into. The numerator is the top number in a fraction and represents how many of these parts there are.
8	$\frac{2}{7}$ + $\frac{3}{7}$ = Given answer: $\frac{5}{14}$ Prove the answer is correct or incorrect.	Incorrect The numerators have been added correctly however the denominators have also been added. Correct answer: $\frac{5}{7}$ It is important that pupils understand that the denominator does not change when adding fractions with like denominators.
9	$\frac{7}{9}$ – $\frac{3}{9}$ = Given answer: $\frac{6}{9}$ Explain how you would complete the calculation.	Incorrect The bar model has been shaded to show $\frac{7}{9}$ but it has been used incorrectly to solve the calculation. $\frac{3}{9}$ has been subtracted from the whole, not from $\frac{7}{9}$. Correct answer: $\frac{4}{9}$ To correct the calculation 3 of the shaded squares should be crossed out, and the number of shaded squares remaining gives the numerator of the fraction (the denominator stays the same).

Question Number	Question	Answer
10	Find $\frac{1}{5}$ of the oranges. Given answer: 15 Explain how to find $\frac{1}{5}$ of the oranges.	Incorrect The answer shows one half of the oranges as there are 30 oranges in total. Correct answers: 6 $30 \div 5 \times 1 = 6$

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Michelle Craig, Instructional Coach,
Sherwood Forest Elementary, Washington

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