Unit 3 – Fractions

Part 1 – Fraction and Division

(1) Fractions and Division (pp. 33-35)

- Review improper fractions and mixed numbers.
- Associate division with fractions.
- Change an improper fraction to a mixed number or whole number by division.
- Express the quotient as a whole number or a mixed number.

In *Primary Mathematics 4A*, students learned to convert from improper fractions to mixed numbers and vice versa by finding the number of fractional parts that made wholes. For example: $\frac{21}{4} = \frac{20}{4} + \frac{1}{4} = 5\frac{1}{4}$.

$$\begin{array}{r} 5 \\ 4\overline{)21} \\ \underline{20} \\ 1 \end{array}$$

In this section, the student will relate the steps for converting to a mixed number to the steps in division, where we need to think of the multiple of 4 that is closest to 21 when dividing 21 by 4. The whole number remainder is 1. If the remainder is further divided, each group would get $\frac{1}{4}$. $\frac{21}{4} = 21 \div 4 = 5\frac{1}{4}$.

If necessary, review the terms proper fraction, improper fraction and mixed number. Also review the conversion of a mixed number into an improper fraction and vice versa. You may also want to review equivalent fractions. Give your student several fractions, such as $\frac{5}{7}$, $\frac{8}{8}$, $\frac{17}{12}$, and $6\frac{2}{3}$ and ask her to identify which one is a proper fraction, an improper fraction, and a mixed number. In a proper fraction, the value is less than 1, and the numerator is smaller than the denominator. In an improper fraction, the value is equal to or greater than 1, and the numerator is equal to or greater than the denominator. Note that there is nothing wrong with an improper fraction, despite its name, and it is OK to write a fraction this way. A mixed number has both a whole number part and a fraction part. Ask her to write $6\frac{2}{3}$ as an improper fraction. She can find the equivalent fraction for 6 with 3 in the denominator and then add: $6\frac{2}{3} = \frac{18}{3} + \frac{2}{3} = \frac{20}{3}$. Or, she can multiply the whole number 6 by the denominator 3 add the product to the numerator and write this sum over the denominator: $6\frac{2}{3} = \frac{(6 \times 3) + 2}{3} = \frac{20}{3}$. Also write some

improper fractions and ask her to write them as mixed numbers. Do some other examples if more review is necessary.

You may want to use Review A, #15-18, #20-23, pp. 62-63 for review.

➤ Write $1 \div 4$. Give your student a paper circle or square and ask him to divide it so that 4 groups get the same amount. Tell him that each group can get a part of a square, but all 4 groups have to get the same size part. Let him solve it on his own before discussing the solution. He can divide the square into fourths, and put one fourth in each group. Write $1 \div 4 = \frac{1}{4}$.

$1 \div 4$

$1 \div 4 = \frac{1}{4}$

Write $9 \div 4$. Give your student 9 paper circles or squares and ask him to divide them into 4 equal groups. Each group can get a part of a square. Allow him to do this on his own before discussing the result.

He could put 2 squares in each group, using 8 of them with a remainder of 1. Then he can divide the one square into fourths and put a fourth in each group. Write $9 \div 4 = 2\frac{1}{4}$. Show this as a vertical division problem. The remainder is 1. If we do not want only whole number answers, we can put the remainder over the divisor (the number we are dividing by) to show the fraction each group gets. Ask him to convert the mixed number answer to an improper fraction. Point out that $9 \div 4 = \frac{9}{4}$.

$9 \div 4 = 2\frac{1}{4}$

$$\begin{array}{r} 2 \\ 4\overline{)9} \\ \underline{8} \\ 1 \end{array}$$

$9 \div 4 = 2\frac{1}{4} = \frac{9}{4}$

We can write any division problem as a fraction, and then convert into a mixed number, or we can perform the division and then divide the remainder as well; the quotient from dividing the remainder is the fraction with the remainder in the numerator and the divisor in the denominator.

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pp. 33-34
Learning Tasks 1-4, pp. 34-35

☑ 1. $\mathbf{2\frac{3}{4}}$

2. $\mathbf{2\frac{2}{3}}$

3. **3; 11;** $\mathbf{2\frac{3}{4}}$

4. (a) $\mathbf{2\frac{1}{3}}$ (b) $\mathbf{2\frac{4}{5}}$ (c) $\mathbf{3\frac{1}{2}}$ (d) $\mathbf{8\frac{5}{9}}$

Workbook Exercise 14

Part 2 - Addition and Subtraction of Unlike Fractions

In *Primary Mathematics 4A*, students learned to add and subtract related fractions. Related fractions are fractions where the denominator of one fraction is a simple multiple of the denominator of the other fraction. Adding or subtracting the fractions therefore involves finding an equivalent fraction of only one of them. For example, $\frac{3}{4}+\frac{1}{8}=\frac{6}{8}+\frac{1}{8}=\frac{7}{8}$. In this part students will learn to add and subtract unlike fractions, where the denominator of one is not a simple multiple of the denominator of the other. So addition and subtraction involves finding equivalent fractions of both. For example, $\frac{3}{8}+\frac{5}{6}=\frac{9}{24}+\frac{20}{24}=\frac{29}{24}=1\frac{5}{24}$. In this example, the equivalent fractions have a denominator that is the lowest common multiple of both 8 and 6. Any equivalent fractions where the denominators are the same can be used. One possible denominator is the product of the denominators of each fraction. In this case equivalent fractions can be obtained by multiplying the numerator and denominator by the denominator of the other fraction: $\frac{3}{8}+\frac{5}{6}=\frac{3\times6}{8\times6}+\frac{5\times8}{6\times8}=\frac{18}{48}+\frac{40}{48}=\frac{58}{48}=\frac{29}{24}=1\frac{5}{24}$. However, using the lowest common multiple of both denominators reduces the need for simplification at the end, and involves smaller numbers, making calculations easier. The student should reduce answers to their simplest form, and convert an answer that is an improper fraction to a mixed number. Some texts call the lowest common multiple of denominators the lowest common denominator.

(1) Addition of Unlike Fractions (pp. 37-38)

- Review factors and multiples.
- Add unlike fractions.

Review factors and multiples if necessary. Ask your student for the factors of 48. Then ask her to list the factors of 60 and find the factors that are common to both 48 and 60.

48: 1, 2, 3, 4, 6, 8, 12, 16, 24, 48

60: 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60

1, 2, 3, 4, 6 and 12 are common factors of 48 and 60.

Ask her to list some multiples of 6 and of 8 and to find some multiplies common to both 6 and 8.

6: 6, 12, 18, 24, 30, 36, 42, 48, ...
8: 8, 16, 24, 32, 40, 48, ...