Revision of Operations with Fractions

Starter

1. **(Review of last lesson)** A ship has sufficient food to supply 600 passengers for 3 weeks. How long would the food last for 800 people?

2.* **(Review of last lesson)** If it takes 6 men 4 days to dig a hole 3 feet deep, how long will it take 10 men to dig a hole 7 feet deep?

3. Without a calculator, find: (a) $2\frac{3}{4}+5\frac{6}{7}$ (b) $8\frac{2}{5}-3\frac{5}{6}$

Notes

Addition and subtraction — make sure you have a common denominator.
Multiplication — multiply the top numbers together and the bottom numbers together.
Division — invert the second fraction and multiply

When working with mixed numbers, is it always a good idea to change them into improper fractions?

Addition — no need to change to improper fractions

Converting to improper fraction can make the numbers difficult to work with, but it can avoid issues when the sum of fraction parts is higher than 1.

Subtraction — change to improper fractions when the fraction part being subtracted is bigger

Change to improper fractions: $3\frac{2}{9}-1\frac{4}{7}$ because $\frac{4}{7}$ is bigger than $\frac{2}{9}$

Do not change to improper fractions: $5\frac{8}{11}-2\frac{3}{13}$ because $\frac{3}{13}$ is smaller than $\frac{8}{11}$

E.g. 1 Without a calculator, find: (a) $3\frac{2}{9}-1\frac{4}{7}$ (b) $5\frac{8}{11}-2\frac{3}{13}$

Multiplication/Division — change to improper fractions

When multiplying or dividing with mixed numbers, we need to change them to improper fractions.

E.g. $2\frac{4}{7}\times 1\frac{3}{8}=\frac{18}{7}\times\frac{11}{8}$ *mixed fractions must be converted to improper fractions*

$=\frac{9}{7}\times\frac{11}{4}$ *cancel numerator and denominator to ease the calculation*

$=\frac{99}{28}$ *numerator × numerator, denominator × denominator*

$=3\frac{15}{28}$ *convert back to a mixed number*

N.B. When dividing mixed numbers:
1. Change to improper fractions.
2. Flip the dividing fraction.
3. Multiply the fractions.

E.g.
$$4\frac{3}{8} \div 2\frac{7}{10} = \frac{35}{8} \div \frac{27}{10}$$ *mixed fractions must be converted to improper fractions*

$$= \frac{35}{8} \times \frac{10}{27}$$ *flip the dividing fraction*

$$= \frac{35}{4} \times \frac{5}{27}$$ *cancel numerator and denominator if possible*

$$= \frac{175}{108}$$ *numerator × numerator, denominator × denominator*

$$= 1\frac{67}{108}$$ *convert back to a mixed number*

E.g. 2 Without a calculator, find: (a) $3\frac{1}{5} \times 2\frac{5}{8}$ (b) $2\frac{3}{4} \div 1\frac{1}{6}$

Video: Fractions - addition/subtraction
Video: Fractions - multiplication
Video: Fractions - division
Video: Mixed number to improper fraction

Solutions to Starter and E.g.s

Exercise
p144 Ex 9.1 Qu 3egi, 4egi, 5aceg, 8ace…, 9ace…, 10-12

Summary
Addition and subtraction — make sure you have a common denominator.
Multiplication — multiply the top numbers together and the bottom numbers together.
Division — invert ("flip") the second fraction and multiply

Adding mixed numbers — no need to change to improper fractions.

Subtracting mixed numbers — change to improper fractions when the fraction part being subtracted is bigger.

Textbook answers (only available during a lockdown)