

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?

Working: 600 passengers \equiv 3 weeks
 1 passenger $\equiv 3 \times 600 = 1800$ weeks *with only 1 passenger to feed, the food would last longer*

$$800 \text{ passengers} \equiv \frac{1800}{800} = 2.25 \text{ weeks}$$

The food would last 2.25 weeks.

- 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?

Working: Start with 6 men, 4 days and 3 feet deep.
 Need to reach 10 men, ?? days, 7 feet deep

Workers	Days	Depth
6	4	3
$6 \div 6 = 1$	24	3
$1 \times 10 = 10$	$24 \div 10 = 12/5$	3
10	$12/5 \div 3 = 12/15 = 4/5$	$3 \div 3 = 1$
10	$4/5 \times 7 = 28/5$	$1 \times 7 = 7$

$$\frac{28}{5} = 5.6 \text{ days}$$

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

Working: (a) $2\frac{3}{4} + 5\frac{6}{7} = 2\frac{21}{28} + 5\frac{24}{28} = 7\frac{45}{28} = 7 + \frac{28}{28} + \frac{17}{28} = 8\frac{17}{28}$

(b) **Either**

$$8\frac{2}{5} - 3\frac{5}{6} = 5\frac{12}{30} - \frac{25}{30}$$

common denominator, subtract integers

$$= 4\frac{30}{30} - \frac{25}{30}$$

cannot do $\frac{12}{30} - \frac{25}{30}$ so take one from the 5

$$= 4\frac{17}{30}$$

or change to improper fractions

$$\begin{aligned}
 8\frac{2}{5} - 3\frac{5}{6} &= \frac{42}{5} - \frac{23}{6} && \text{convert to improper fractions} \\
 &= \frac{252}{30} - \frac{115}{30} && \text{get a common denominator} \\
 &= \frac{137}{30} && \text{subtract} \\
 &= 4\frac{17}{30} && \text{convert back to a mixed number}
 \end{aligned}$$

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

Working:

$$\begin{aligned}
 \text{(a)} \quad 3\frac{2}{9} - 1\frac{4}{7} &= \frac{29}{9} - \frac{11}{7} = \frac{203}{63} - \frac{99}{63} = \frac{104}{63} = 1\frac{41}{63} \\
 \text{(b)} \quad 5\frac{8}{11} - 2\frac{3}{13} &= 3\frac{104}{143} - \frac{33}{143} = 3\frac{71}{143}
 \end{aligned}$$

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*

$$\begin{aligned}
 &= \frac{9}{7} \times \frac{11}{4} && \text{cancel numerator and denominator to ease the calculation} \\
 &= \frac{99}{28} && \text{numerator} \times \text{numerator, denominator} \times \text{denominator} \\
 &= 3\frac{15}{28} && \text{convert back to a mixed number}
 \end{aligned}$$

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*

$$\begin{aligned}
 &= \frac{35}{8} \times \frac{10}{27} && \text{flip the dividing fraction} \\
 &= \frac{8}{35} \times \frac{27}{5} && \text{cancel numerator and denominator if possible} \\
 &= \frac{4}{175} \times \frac{27}{27} && \text{numerator} \times \text{numerator, denominator} \times \text{denominator} \\
 &= \frac{108}{175} && \\
 &= 1\frac{67}{108} && \text{convert back to a mixed number}
 \end{aligned}$$

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

Working: (a) $3\frac{1}{5} \times 2\frac{5}{8} = \frac{16}{5} \times \frac{21}{8} = \frac{2}{5} \times \frac{21}{1} = \frac{42}{5} = 8\frac{2}{5}$

(b) $2\frac{3}{4} \div 1\frac{1}{6} = \frac{11}{4} \div \frac{7}{6} = \frac{11}{4} \times \frac{6}{7} = \frac{11}{2} \times \frac{3}{7} = \frac{33}{14} = 2\frac{5}{14}$

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

[Textbook answers \(only available during a lockdown\)](#)