Adding and subtracting fractions with a different denominator

The same rules apply for questions with a mix of whole numbers and fractions. Here are some examples:

Simplify these expressions which have a mix of whole numbers and fractions

(i) $3+\frac{1}{4}$

$3+\frac{1}{4} = 3\frac{1}{4}$ — Write the fraction after the whole number

(ii) $1-\frac{2}{5}$

$1-\frac{2}{5} = \frac{5}{5}-\frac{2}{5}$ — Write the whole number as a fraction with same denominator

$= \frac{3}{5}$ — Subtract the numerators **only**

(iii) $4-\frac{2}{7}$

$4-\frac{2}{7} = \frac{28}{7}-\frac{2}{7}$ — Write the whole number as a fraction with same denominator

$= \frac{26}{7}$

$= 3\frac{5}{7}$ — Simplify fraction

4 Simplify these expressions:

a $2+\frac{1}{2}$

b $1+\frac{3}{4}$

c $1-\frac{2}{3}$

d $1-\frac{3}{8}$

e $2-\frac{3}{5}$

f $4-\frac{1}{4}$

g $3-\frac{5}{3}$

h $5-\frac{5}{2}$

Multiplying and dividing fractions

To **multiply** fractions, just remember: Multiply the numerators (top) and the denominators (bottom)

$$\frac{1}{3} \text{ of } \frac{2}{5} = \frac{1}{3} \times \frac{2}{5} = \frac{1 \times 2}{3 \times 5} = \frac{2}{15}$$

To **divide** an amount by a fraction, just remember: flip the second fraction then multiply

$$\frac{1}{3} \div \frac{2}{5} = \frac{1}{3} \times \frac{5}{2}$$ **Only** flip the second fraction

$$= \frac{1 \times 5}{3 \times 2}$$

$$= \frac{5}{6}$$

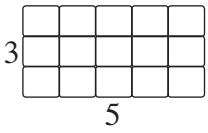
Change the '÷' to a '×'

Remember: A flipped fraction is called the **reciprocal** fraction

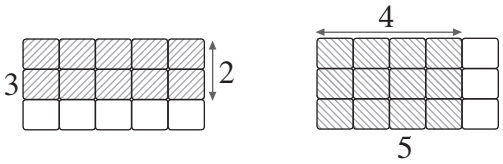
Simplify these:

We can use shaded diagrams to calculate the multiplication of two fractions

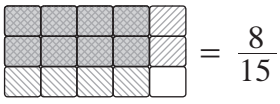
(i) $\frac{2}{3}$ of $\frac{4}{5}$



Draw a grid using the denominators as the dimensions



Use the numerators to shade columns/rows



$$= \frac{8}{15}$$

$$\therefore \frac{2}{3} \times \frac{4}{5} = \frac{8}{15}$$

Write where they **overlap** as a fraction

If whole numbers are involved, write them as a fraction

(ii) $28 \div \frac{2}{7}$

$$\therefore 28 \div \frac{2}{7} = 28 \times \frac{7}{2}$$ Flip the second fraction and change sign to '×'

$$= \frac{28}{1} \times \frac{7}{2}$$ Write the whole number as a fraction

$$= \frac{196}{2}$$

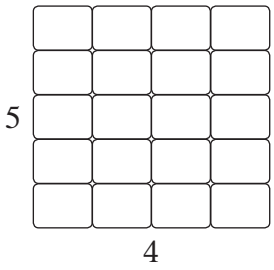
$$= \frac{98}{1}$$ Simplify

$$= 98$$

Multiplying and dividing fractions

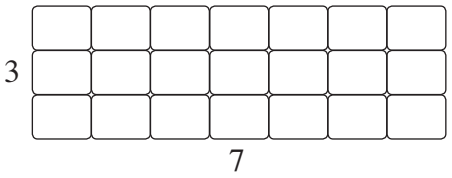
1 Calculate these fraction multiplications by shading the given grids:

a $\frac{1}{5}$ of $\frac{3}{4}$



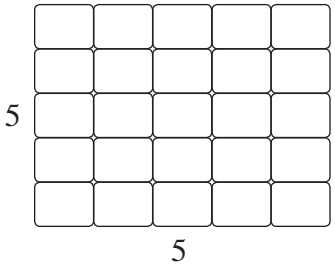
$\therefore \frac{1}{5}$ of $\frac{3}{4} = \frac{\square}{\square}$

b $\frac{2}{3}$ of $\frac{4}{7}$



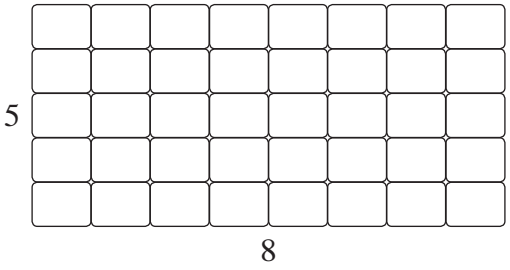
$\therefore \frac{2}{3}$ of $\frac{4}{7} = \frac{\square}{\square}$

c $\frac{4}{5}$ of $\frac{4}{5}$



$\therefore \frac{4}{5}$ of $\frac{4}{5} = \frac{\square}{\square}$

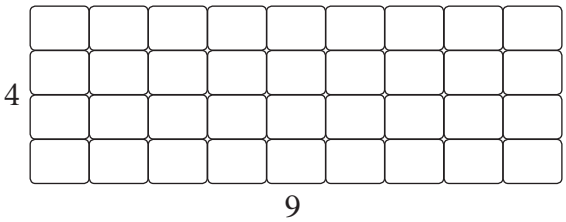
d $\frac{2}{5}$ of $\frac{3}{8}$



$\therefore \frac{2}{5}$ of $\frac{3}{8} = \frac{\square}{\square} = \frac{\square}{\square}$

simplified

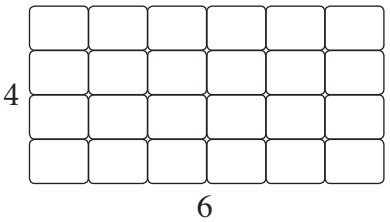
e $\frac{3}{4}$ of $\frac{7}{9}$



$\therefore \frac{3}{4}$ of $\frac{7}{9} = \frac{\square}{\square} = \frac{\square}{\square}$

simplified

f $\frac{3}{4}$ of $\frac{5}{6}$



$\therefore \frac{3}{4}$ of $\frac{5}{6} = \frac{\square}{\square} = \frac{\square}{\square}$

simplified

Multiplying and dividing fractions

2 Simplify these without the aid of a calculator:

a $\frac{1}{2} \times \frac{1}{3}$

b $\frac{3}{5} \times \frac{1}{4}$

c $\left(\frac{2}{3}\right)^2$ psst: this is just $\frac{2}{3} \times \frac{2}{3}$

d $\left(\frac{3}{5}\right)^2$

e $\frac{1}{3} \div \frac{3}{2}$

f $\frac{2}{11} \div \frac{1}{4}$

g $\frac{5}{6} \div 4$

h $\frac{3}{4} \div 8$

i $10 \times \frac{4}{5}$

j $24 \times \frac{3}{8}$

k $12 \div \frac{3}{5}$

l $2 \div \frac{2}{13}$

Multiplying and dividing fractions

3 Simplify these without the aid of a calculator, remembering to write the answer in simplest form.

a $\left(\frac{2}{8}\right)^2$

b $\frac{3}{4} \times \frac{3}{2}$

c $\frac{3}{8} \div \frac{5}{4}$

d $\frac{2}{3} \div \frac{5}{3}$

e $\frac{9}{10} \div \frac{8}{5}$

f $\frac{3}{4} \times \frac{2}{3} \times \frac{1}{2}$ psst: same as the others!

g $\frac{2}{5} \times \frac{3}{6} \times \frac{1}{3}$

h $\frac{1}{2} \div 4 \div \frac{1}{2}$ psst: work left to right!

4 Is $\frac{2}{3}$ of $\frac{4}{6}$ exactly the same as $\frac{2}{3} \div \frac{12}{8}$? Explain your answer.