



## Calculations with fractions

- Adding and subtracting fractions with different denominators
- Multiplying and dividing whole numbers by fractions

Keywords

You should know

### explanation 1

**1** Work these out, giving each answer in its lowest terms.

**a**  $\frac{4}{7} + \frac{2}{7}$

**b**  $\frac{3}{5} - \frac{1}{5}$

**c**  $\frac{2}{13} + \frac{5}{13}$

**d**  $\frac{3}{16} + \frac{5}{16}$

**e**  $\frac{7}{18} - \frac{1}{18}$

**f**  $\frac{8}{21} - \frac{5}{21}$

**g**  $\frac{7}{25} + \frac{14}{25}$

**h**  $\frac{19}{30} - \frac{11}{30}$

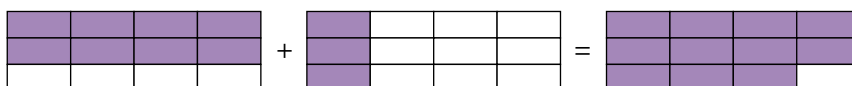
**i**  $\frac{13}{15} - \frac{4}{15}$

**j**  $\frac{5}{18} + \frac{7}{18}$

**k**  $\frac{7}{20} + \frac{9}{20}$

**l**  $\frac{13}{24} - \frac{7}{24}$

**2** Copy and complete.



$$\frac{2}{3} + \frac{1}{4} = \frac{\square}{12} + \frac{\square}{12} = \frac{\square}{12} + \frac{\square}{12} = \frac{\square}{12}$$

**3** Work these out.

**a**  $\frac{1}{5} + \frac{7}{10}$

**b**  $\frac{3}{8} + \frac{1}{4}$

**c**  $\frac{5}{12} + \frac{1}{6}$

**d**  $\frac{2}{7} + \frac{3}{14}$

**e**  $\frac{3}{8} + \frac{9}{16}$

**f**  $\frac{5}{6} + \frac{1}{12}$

**g**  $\frac{3}{10} + \frac{12}{20}$

**h**  $\frac{7}{16} + \frac{3}{8}$

**4** Work these out.

**a**  $\frac{1}{4} + \frac{2}{3}$

**b**  $\frac{1}{6} + \frac{5}{9}$

**c**  $\frac{1}{3} + \frac{3}{5}$

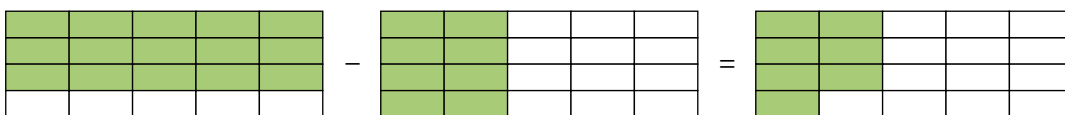
**d**  $\frac{2}{7} + \frac{1}{4}$

**e**  $\frac{2}{5} + \frac{1}{3}$

**f**  $\frac{3}{7} + \frac{2}{5}$

**g**  $\frac{7}{12} + \frac{5}{18}$

**h**  $\frac{11}{15} + \frac{4}{25}$

**5** Copy and complete.


$$\frac{3}{4} - \frac{2}{5} = \frac{\square}{20} - \frac{\square}{20} = \frac{\square - \square}{20} = \frac{\square}{20}$$

**6** Work these out.

**a**  $\frac{7}{12} - \frac{1}{6}$

**b**  $\frac{3}{4} - \frac{5}{8}$

**c**  $\frac{13}{16} - \frac{5}{8}$

**d**  $\frac{4}{5} - \frac{7}{10}$

**e**  $\frac{13}{18} - \frac{4}{9}$

**f**  $\frac{4}{5} - \frac{7}{20}$

**g**  $\frac{2}{3} - \frac{11}{18}$

**h**  $\frac{23}{24} - \frac{5}{6}$

**7** Work these out. Give your answers in their lowest terms.

**a**  $\frac{8}{9} - \frac{1}{2}$

**b**  $\frac{3}{5} - \frac{1}{4}$

**c**  $\frac{2}{3} - \frac{2}{7}$

**d**  $\frac{5}{8} - \frac{1}{3}$

**e**  $\frac{5}{6} - \frac{7}{10}$

**f**  $\frac{7}{8} - \frac{2}{3}$

**g**  $\frac{4}{5} - \frac{3}{8}$

**h**  $\frac{5}{6} - \frac{3}{4}$

**explanation 2**
**8** Work these out and simplify your answers.

**a**  $\frac{1}{3} + \frac{4}{5}$

**b**  $\frac{6}{7} + \frac{1}{4}$

**c**  $\frac{5}{12} + \frac{5}{8}$

**d**  $\frac{4}{5} + \frac{3}{7}$

**e**  $\frac{5}{6} + \frac{3}{7}$

**f**  $1\frac{2}{5} + \frac{7}{9}$

**g**  $\frac{5}{7} + 1\frac{1}{3}$

**h**  $2\frac{1}{2} + \frac{4}{5}$

**9** Work these out and simplify your answers.

**a**  $1 - \frac{4}{15}$

**b**  $1\frac{3}{8} - \frac{3}{4}$

**c**  $1\frac{1}{5} - \frac{7}{10}$

**d**  $1\frac{7}{12} - \frac{2}{3}$

**e**  $1\frac{1}{3} - \frac{1}{2}$

**f**  $1\frac{1}{4} - \frac{2}{3}$

**g**  $1\frac{2}{5} - \frac{1}{2}$

**h**  $1\frac{3}{4} - \frac{5}{6}$

- 10** Although early Egyptians used fractions like  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$  and so on, they did not have notation to write fractions such as  $\frac{2}{3}$ ,  $\frac{4}{5}$  or  $\frac{2}{11}$ .

The fractions they used all have a numerator of one and are called unit fractions. The Egyptians were able to write any fraction as a sum of unit fractions. For example,

$$\frac{3}{8} = \frac{2}{8} + \frac{1}{8} = \frac{1}{4} + \frac{1}{8} \qquad \frac{5}{12} = \frac{1}{4} + \frac{1}{6} \qquad \frac{7}{9} = \frac{1}{2} + \frac{1}{4} + \frac{1}{36}$$

Write these fractions as Egyptian fractions.

**a**  $\frac{5}{8}$       **b**  $\frac{7}{12}$       **c**  $\frac{13}{15}$       **d**  $\frac{9}{20}$       **e**  $\frac{17}{30}$

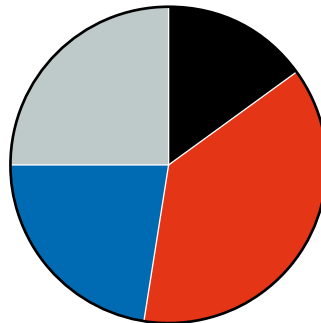
**explanation 3**

- 11** Work these out.

**a**  $\frac{2}{3}$  of 18      **b**  $\frac{2}{5}$  of £240      **c**  $\frac{3}{8}$  of 160 g      **d**  $\frac{4}{7}$  of 50 kg  
**e** three quarters of 75      **f** five ninths of 30  
**g**  $\frac{5}{12}$  of 100 cm      **h**  $\frac{5}{6}$  of 84p

- 12** This pie chart shows the colours of 80 cars in a car park.

- a**  $\frac{1}{4}$  of the cars are silver.  
How many silver cars are there?
- b**  $\frac{3}{8}$  of the cars are red.  
How many red cars are there?
- c** There are 12 black cars.  
What fraction of the total number of cars is this?
- d** How many blue cars are there?
- e** What fraction of the cars are blue?
- f** The sum of the angles at the centre of the pie chart is  $360^\circ$ .  
Find the angle for each sector.



explanation 4a

explanation 4b

**13** Work these out.

**a**  $\frac{2}{7} \times 14$

**b**  $\frac{4}{6} \times 24$

**c**  $\frac{7}{12} \times 84$

**d**  $\frac{7}{8} \times 16$

**e**  $\frac{2}{3} \times 16$

**f**  $\frac{5}{7} \times 30$

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

**h**  $1\frac{2}{9} \times 7$

**14** Find these amounts.

**a**  $\frac{5}{6} \times 36 \text{ kg}$

**b**  $1\frac{1}{9} \times 18 \text{ m}$

**c**  $\frac{7}{12} \times 36 \text{ kg}$

**d**  $1\frac{2}{3} \times 33 \text{ cm}$

**e**  $2\frac{1}{2} \times 50 \text{ mm}$

**f**  $1\frac{4}{5} \times 120 \text{ g}$

**15** Copy and complete.

$3 \times 4 = \square$

$2 \times 4 = \square$

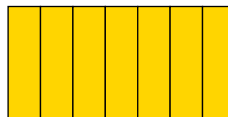
$1 \times 4 = \square$

$\frac{1}{2} \times 4 = \square$

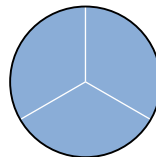
$\frac{1}{3} \times 4 = \square$

explanation 5

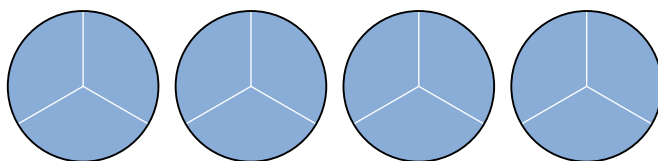
**16 a** How many sevenths are there in this rectangle?



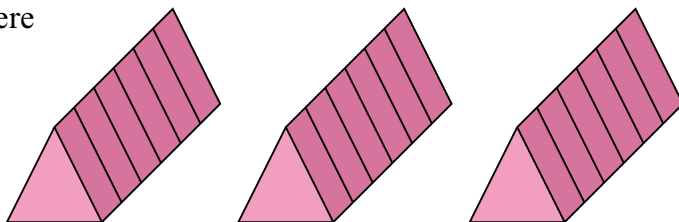
**b** How many thirds are there in this circle?



- 17 a** How many thirds are there in these four circles?



- b** How many sixths are there in these three prisms?



- 18 a** How many quarters are there in 20?

- b** Copy and complete this number sentence.  $20 = \square \times \frac{1}{4}$

- 19** Copy and complete this sentence.

Dividing by  $\frac{1}{5}$  is the same as multiplying by  $\square$ .

- 20** Work these out.

**a**  $10 \div \frac{1}{2}$

**b**  $9 \div \frac{1}{3}$

**c**  $12 \div \frac{1}{5}$

**d**  $20 \div \frac{1}{7}$

**e**  $8 \div \frac{1}{4}$

**f**  $15 \div \frac{1}{6}$

**g**  $3 \div \frac{1}{10}$

**h**  $1 \div \frac{1}{12}$

- 21** Copy and complete these sentences.

**a**  $30 \times \frac{1}{5} = \square$  therefore  $\square \div \frac{1}{5} = 30$

**b**  $15 \times \frac{2}{5} = \square$  therefore  $\square \div \frac{2}{5} = 15$

**c**  $\square \times \frac{3}{5} = 6$  therefore  $6 \div \frac{3}{5} = \square$

**d**  $\square \times \frac{4}{5} = 8$  therefore  $8 \div \frac{4}{5} = \square$

- 22** Your answers to questions **15** and **21** will help you answer these.

- a** When you multiply a positive number by a fraction less than one, is the answer a smaller or larger number?
- b** When you divide a positive number by a fraction less than one, is the answer a smaller or larger number?