Dividing a fraction by a whole number ❷

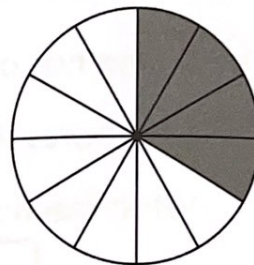**1** This circle is divided into twelfths.

4 of the twelfths can be divided into 2 equal groups.

How many twelfths are there in each group?
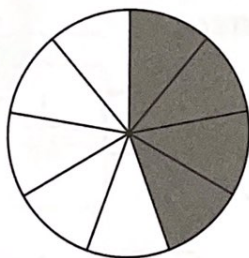
There are ☐ twelfths in each group.

Write this as a division.

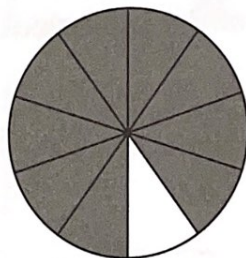$\frac{4}{12} \div 2 = \frac{\boxed{}}{\boxed{}}$

2 Use the diagrams to help you work out the divisions.

a)
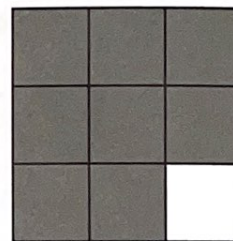
$\frac{4}{9} \div 2 = \frac{\boxed{}}{\boxed{}}$

b)

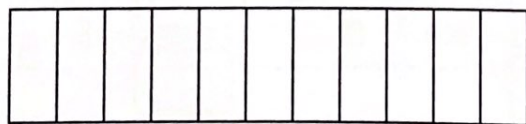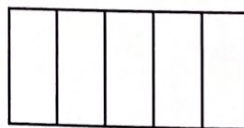$\frac{9}{10} \div 3 = \frac{\boxed{}}{\boxed{}}$

c)

$\frac{8}{9} \div 2 = \frac{\boxed{}}{\boxed{}}$

3 Work out these divisions.

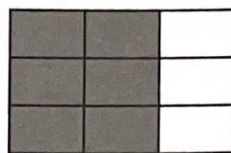a) $\frac{10}{11} \div 5 = \frac{\boxed{}}{\boxed{}}$

b) $\frac{4}{5} \div 4 = \frac{\boxed{}}{\boxed{}}$

4 Write a calculation for this diagram.

$$\frac{\square}{\square} \div \square = \frac{\square}{\square}$$

5 Work out these divisions.

a) $\dfrac{5}{9} \div 5 = \dfrac{\square}{\square}$

b) $\dfrac{3}{4} \div 3 = \dfrac{\square}{\square}$

c) $\dfrac{6}{7} \div 2 = \dfrac{\square}{\square}$

d) $\dfrac{8}{15} \div 2 = \dfrac{\square}{\square}$

6 Complete these number sentences.

a) $\dfrac{\square}{5} \div 2 = \dfrac{1}{5}$

$\dfrac{\square}{5} \div 2 = \dfrac{2}{5}$

b) $\dfrac{\square}{20} \div 3 = \dfrac{2}{20}$

$\dfrac{\square}{20} \div 3 = \dfrac{5}{20}$

c) $\dfrac{14}{15} \div \square = \dfrac{2}{15}$

$\dfrac{14}{15} \div \square = \dfrac{7}{15}$

$\dfrac{14}{15} \div \square = \dfrac{1}{15}$

$\dfrac{14}{15} \div \square = \dfrac{14}{15}$

d) $\dfrac{40}{45} \div \square = \dfrac{4}{45}$

$\dfrac{40}{45} \div \square = \dfrac{5}{45}$

$\dfrac{40}{45} \div \square = \dfrac{20}{45}$

$\dfrac{40}{45} \div \square = \dfrac{8}{45}$

7 A snail travels $\frac{12}{15}$ km in 3 days. It travels the same distance each day.

What fraction of a km does the snail travel each day?

8 Max is dividing a fraction by a whole number.

CHALLENGE

He simplifies his answer. Work out the missing numbers.

$$\frac{\boxed{}}{18} \div 3 = \frac{2}{9} \qquad \frac{\boxed{}}{60} \div 4 = \frac{7}{30} \qquad \frac{\boxed{}}{24} \div 2 = \frac{3}{8}$$

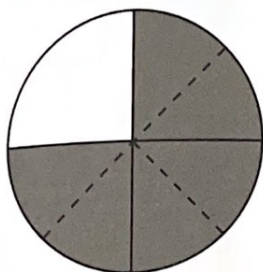# Reflect

Danny says $\frac{10}{15} \div 5 = \frac{2}{3}$.

Explain the mistake Danny has made. What is the correct answer? Prove it.

Dividing a fraction by a whole number ③

① a) Use the diagram to help you work out $\frac{3}{4} \div 2$.

$$\frac{3}{4} \div 2 = \frac{\boxed{}}{8} \div 2 = \frac{\boxed{}}{8}$$

b) Use the diagram to help you work out $\frac{2}{5} \div 3$.

$$\frac{2}{5} \div 3 = \frac{\boxed{}}{15} \div 3 = \frac{\boxed{}}{15}$$

② Use the diagrams to work out the divisions.

a)

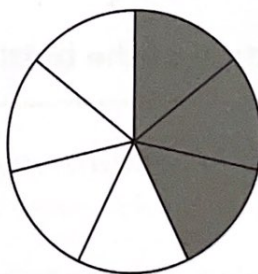$$\frac{3}{5} \div 2 = \frac{\boxed{}}{10} \div 2 = \frac{\boxed{}}{10}$$

b)

$$\frac{3}{7} \div 2 = \frac{\boxed{}}{\boxed{}} \div 2 = \frac{\boxed{}}{\boxed{}}$$

3 Complete these calculations.

a) $\dfrac{5}{8} \div 2 = \dfrac{\boxed{}}{16} \div 2$

$= \dfrac{\boxed{}}{16}$

b) $\dfrac{4}{5} \div 3 = \dfrac{\boxed{}}{15} \div 3$

$= \dfrac{\boxed{}}{\boxed{}}$

c) $\dfrac{5}{8} \div 3 = \dfrac{\boxed{}}{\boxed{}} \div \boxed{}$

$=$

d) $\dfrac{3}{10} \div 4 = \dfrac{\boxed{}}{\boxed{}} \div \boxed{}$

$=$

e) $\dfrac{2}{9} \div 5 = \dfrac{\boxed{}}{\boxed{}} \div \boxed{}$

$=$

f) $\dfrac{5}{9} \div 2 = \dfrac{\boxed{}}{\boxed{}} \div \boxed{}$

$=$

4 Complete these calculations. Give each answer in its simplest form.

a) $\dfrac{2}{5} \div 4 = \dfrac{\boxed{}}{20} \div 4$

$= \dfrac{\boxed{}}{20} = \dfrac{\boxed{}}{10}$

b) $\dfrac{2}{6} \div 3 = \dfrac{\boxed{}}{18} \div 3$

$= \dfrac{\boxed{}}{18} = \dfrac{\boxed{}}{\boxed{}}$

5 A bottle of milk is $\dfrac{4}{5}$ full. The milk is shared equally between 10 glasses.

What fraction of the bottle of milk will be in each glass?

6 Work out the values of the symbols.

CHALLENGE

$$\frac{3}{8} \div 2 = \blacksquare \qquad \frac{4}{5} \div 2 = \bullet \qquad \frac{3}{4} \div \blacklozenge = \frac{3}{20} \qquad \frac{2}{3} \div \blacktriangle = \frac{1}{6}$$

Work out these calculations.

a) $\blacksquare \div \blacklozenge = \dfrac{\boxed{}}{\boxed{}}$

b) $\bullet \div \blacktriangle = \dfrac{\boxed{}}{\boxed{}}$

c) $\bullet \div \blacklozenge = \dfrac{\boxed{}}{\boxed{}}$

Reflect

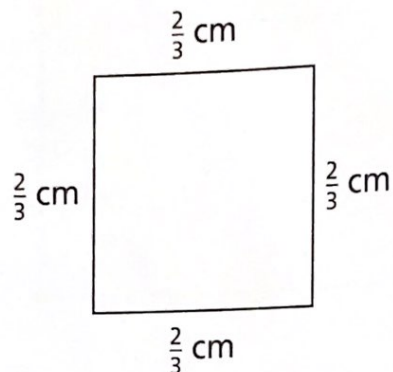Describe how you would find $\frac{2}{7} \div 4$. Explain why you would use this method.

Four rules with fractions

1 Work out the perimeter of each shape.

a)

$\frac{2}{3}$ cm
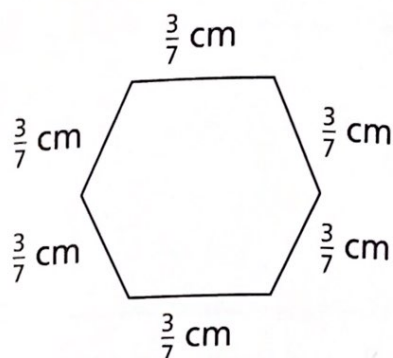
$\frac{2}{3}$ cm $\frac{2}{3}$ cm

$\frac{2}{3}$ cm

$\frac{2}{3} \times 4 = \dfrac{\boxed{}}{\boxed{}}$

$= \boxed{} \dfrac{\boxed{}}{\boxed{}}$

The perimeter is $\boxed{} \dfrac{\boxed{}}{\boxed{}}$ cm.

b)

$\frac{3}{7}$ cm

$\frac{3}{7}$ cm $\frac{3}{7}$ cm
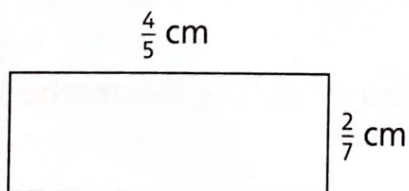
$\frac{3}{7}$ cm $\frac{3}{7}$ cm

$\frac{3}{7}$ cm

$\dfrac{\boxed{}}{\boxed{}} \times \boxed{} = \dfrac{\boxed{}}{\boxed{}}$

$= \boxed{} \dfrac{\boxed{}}{\boxed{}}$

The perimeter is $\boxed{} \dfrac{\boxed{}}{\boxed{}}$ cm.

2 Work out the area and perimeter of the rectangle.

$\frac{4}{5}$ cm

$\frac{2}{7}$ cm

3 Richard lives $\frac{3}{7}$ km from school.

Each day he walks to school and walks home.

How far does he walk in total from Monday to Friday?
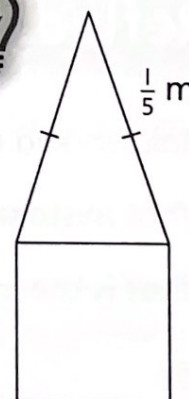
4 Work out these calculations.

a) $\frac{1}{3} + \frac{1}{4} \times \frac{1}{3} = \dfrac{\boxed{}}{\boxed{}}$

b) $\frac{1}{5} \times \frac{2}{3} \div 2 = \dfrac{\boxed{}}{\boxed{}}$

5 This shape is made of a square and an isosceles triangle. The perimeter of the whole shape is $\frac{7}{10}$ metres.
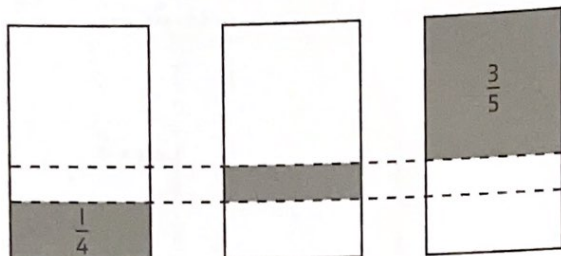
$\frac{1}{5}$ m

How long is each side of the square?

CHALLENGE

6 Here are three identical rectangles. A part of each rectangle is shaded.

What fraction of the middle rectangle is shaded?

$\frac{3}{5}$

$\frac{1}{4}$

> I will say that the whole area of the rectangle is 1.

Reflect

Max worked out $\frac{1}{2} + \frac{1}{4} \times \frac{1}{2}$.

What mistake did Max make?

What is the correct answer?

> First I did $\frac{1}{2} + \frac{1}{4} = \frac{3}{4}$.
>
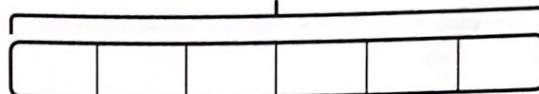> Then I did $\frac{3}{4} \times \frac{1}{2} = \frac{3}{8}$.

Max

Calculating fractions of amounts

1 There are 48 buttons in a box. $\frac{5}{6}$ of the buttons are red and the rest are blue.

48 buttons

How many buttons are blue?

2 Andy won £720 in a competition. He gave $\frac{1}{3}$ of the money to his sister.

How much money did he have left?

3 Kate and Ebo each bake 60 cookies for charity. Kate sells $\frac{2}{3}$ of her cookies. Ebo sells $\frac{7}{12}$ of his cookies.

Who sells more cookies? How many more?

4 A box of chocolates costs £4·80. Sofia pays $\frac{4}{5}$ and Holly pays the rest.

How much more does Sofia pay than Holly?

5 Work out these calculations.

a) $\frac{9}{10}$ of 170 km = ☐ km

c) $\frac{1}{7}$ of 0·35 km = ☐ _____

b) $\frac{1}{5}$ of 3 hours = ☐ _____

I wonder if I can change the units in parts b) and c).

6 Use <, > or = to complete the sentences. Use a diagram to help you.

a) $\frac{3}{7}$ of 70 ◯ $\frac{5}{7}$ of 70

b) $\frac{2}{5}$ of 45 ◯ $\frac{2}{3}$ of 45

7 Amelia bakes 36 biscuits. She keeps $\frac{1}{3}$ of the biscuits.

Amelia gives $\frac{5}{8}$ of the remaining biscuits to her dad and the rest to her mum.

How many biscuits does she give to her mum?

CHALLENGE

Reflect

Which question did you find the most challenging? How did you work it out?
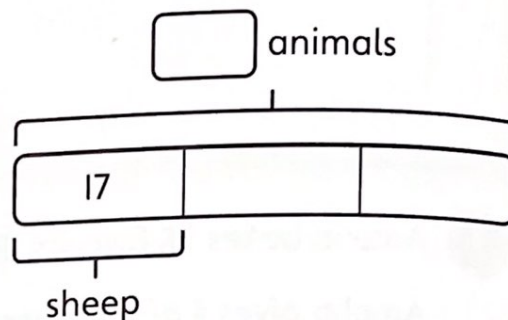
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Problem solving – fractions of amounts

1 $\frac{1}{3}$ of the animals in a field are sheep. There are 17 sheep in the field.

How many animals are in the field?

17 sheep = $\frac{1}{3}$ of the animals

17 × ☐ = ☐

There are ☐ animals in the field.

☐ animals

17		

sheep

2 $\frac{5}{6}$ of a number is 60. What is the number?

3 Danny spends $\frac{2}{5}$ of his pocket money on a magazine. The magazine costs £3. How much pocket money does he get?

4 Last week, Toshi spent £42 on a food shop. This is $\frac{1}{7}$ of his weekly wage.

Holly spent £54. This is $\frac{2}{9}$ of her weekly wage.

Who earns more money per week? How much more?

5 Use a diagram to work out the missing numbers.

a) $\frac{1}{4}$ of ⬜ = 20

b) $\frac{3}{4}$ of ⬜ = 48

c) $180 = \frac{9}{10}$ of ⬜

d) $\frac{1}{6}$ of ⬜ = $\frac{2}{3}$ of 27

6 Zac is thinking of a number. What number is Zac thinking of?

$\frac{3}{8}$ of my number is 2·4.

Zac

7 **a)** On Monday, Alex reads $\frac{1}{4}$ of a book. On Tuesday, she reads $\frac{3}{5}$ of the book. She has 18 pages left to read. How many pages are in her book?

CHALLENGE

b) On Monday, Lee reads $\frac{1}{4}$ of a book. On Tuesday, he reads $\frac{3}{5}$ of the remaining pages. He has 18 pages left to read. How many pages are there in Lee's book?

Reflect

$\frac{3}{4}$ of 60 = ☐ $\frac{3}{4}$ of ☐ = 60

What is the same? What is different? Work out the missing numbers.