Power puzzle

Work out the following fraction calculations, then write down the next two lines.

$\frac{1}{2} + \frac{1}{4} = \dfrac{\square}{\square}$

$\frac{1}{2} + \frac{1}{4} + \frac{1}{8} = \dfrac{\square}{\square}$

$\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} = \dfrac{\square}{\square}$

$\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \frac{1}{32} = \dfrac{\square}{\square}$

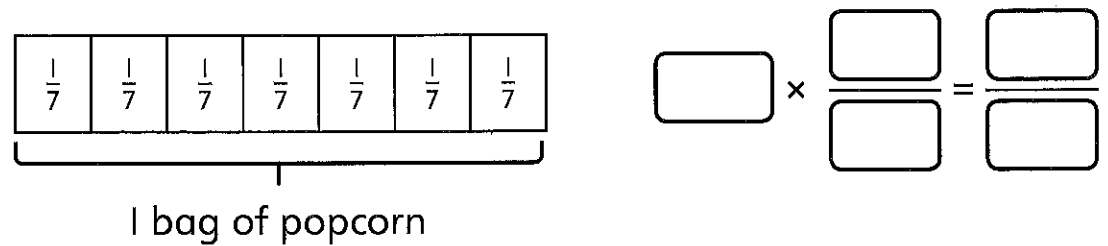What do you notice? Write down the next two lines.

Can you find 5 fractions that have a sum of 1? All the fractions must have different denominators. Explain your method.
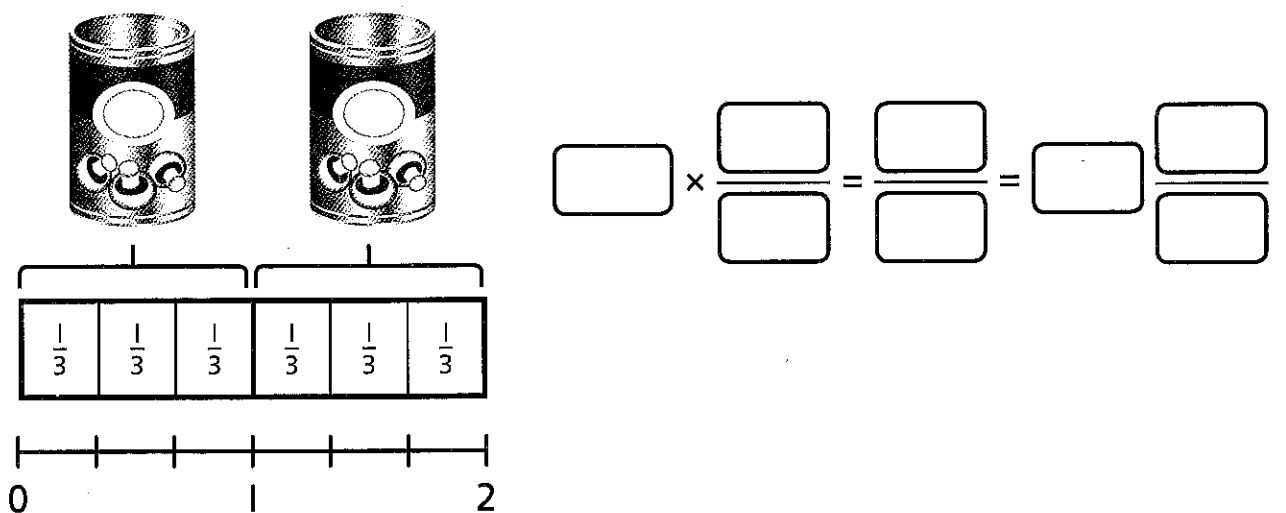
Multiplying fractions ❶

1 **a)** Each child eats $\frac{1}{7}$ of a bag of popcorn.

What fraction of the bag do 5 children eat?

| $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{1}{7}$ |

1 bag of popcorn

$\square \times \dfrac{\square}{\square} = \dfrac{\square}{\square}$

b) 1 person eats $\frac{1}{3}$ of a tin of soup.

How many tins of soup are needed for 5 people?

| $\frac{1}{3}$ | $\frac{1}{3}$ | $\frac{1}{3}$ | $\frac{1}{3}$ | $\frac{1}{3}$ | $\frac{1}{3}$ |

0   1   2

$\square \times \dfrac{\square}{\square} = \dfrac{\square}{\square} = \square \dfrac{\square}{\square}$

c) Mike uses $\frac{1}{4}$ of a banana in his cake. How many bananas does he need for 9 cakes?

2 Fill in the blank boxes to complete the multiplications.

a) $7 \times \frac{1}{8} = \boxed{}$ $\frac{1}{8} \times 7 = \boxed{}$

b) $\frac{1}{10} \times \boxed{} = \frac{7}{10}$ $\boxed{} \times \frac{1}{10} = \frac{7}{10}$

c) $\boxed{} \times 4 = \frac{4}{9}$ $4 \times \boxed{} = \frac{4}{9}$

3 Complete the multiplications.

a) $\frac{1}{5} \times 2 = \boxed{}$

b) $\frac{1}{7} \times 6 = \boxed{}$

4 Complete the multiplications.

a) $5 \times \frac{1}{2} = \boxed{} = \boxed{}$

b) $\frac{1}{4} \times 7 \text{ kg} = \boxed{} \text{ kg} = \boxed{} \text{ kg}$

c) $\frac{1}{3} \times 5 = 5 \times \boxed{}$

d) $\frac{1}{8} \times \boxed{} = 1$

e) $\frac{1}{5} \times 9 = \boxed{} = \boxed{}$

f) $11 \times \frac{1}{3} \text{ l} = \boxed{} \text{ l} = \boxed{} \text{ l}$

5 Complete the multiplications.

a) $\frac{1}{5} \times \boxed{} = 1\frac{2}{5}$

b) $\frac{1}{\boxed{}} \times \boxed{} = 1\frac{1}{8}$

6 For each part below, circle your answer and complete the sentence.

a) $0 \times \frac{1}{8}$ is equal to $\frac{1}{8}$

This is true / false because _____.

b) $8 \times \frac{1}{8} = 1$

This is true / false because _____.

c) $\frac{1}{8} \times 6$ is equal to three-quarters

This is true / false because _____.

7 Complete the multiplications.

a) $\frac{1}{10} \times \boxed{} = \frac{3}{5}$

b) $\frac{1}{6} \times \boxed{} = 1\frac{1}{3}$

CHALLENGE

Reflect

The answer is $\frac{4}{5}$.

$\boxed{} \times \boxed{}$ or $\boxed{} \times \boxed{}$

What was the question? Explain your reasoning.

_____

_____

_____

_____

Multiplying fractions ❷

1 Each box contains $\frac{3}{10}$ of a pizza.

How much pizza is there in total?

I box

0 ⎯⎯⎯⎯⎯⎯⎯ I

$$\frac{3}{10} \times 3 = \frac{\boxed{}}{10}$$
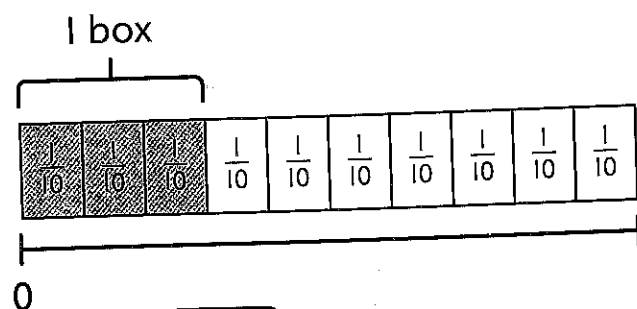
There are $\dfrac{\boxed{}}{10}$ of a pizza in total.
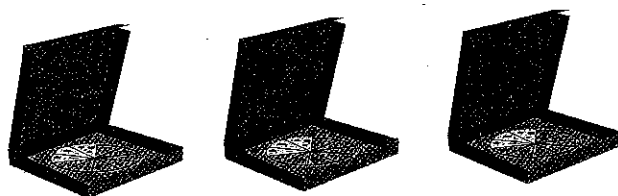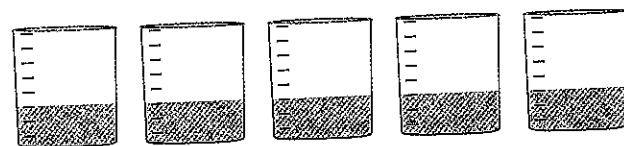
2 Each glass contains $\frac{3}{8}$ litres of milk.

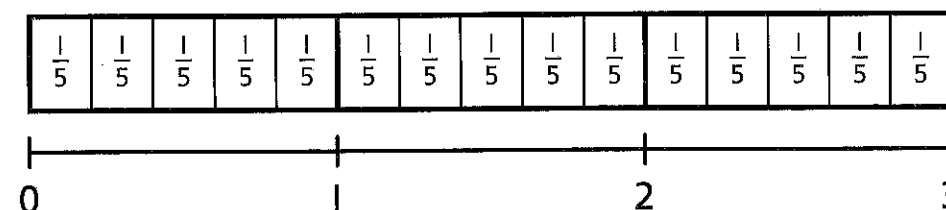How many litres of milk are there in total?

I glass

0 ⎯⎯⎯⎯⎯⎯⎯ I

$$\frac{3}{8} \times 5 = \frac{\boxed{}}{8} = \boxed{}\frac{\boxed{}}{8}$$
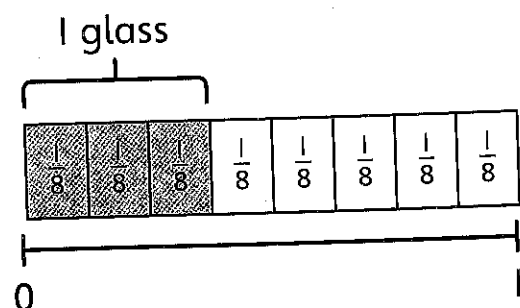
There are $\boxed{}\dfrac{\boxed{}}{\boxed{}}$ litres of milk in total.

3 a) Use the model to help you work out $\frac{3}{5} \times 4$.

| $\frac{1}{5}$ | $\frac{1}{5}$ | $\frac{1}{5}$ | $\frac{1}{5}$ | $\frac{1}{5}$ | $\frac{1}{5}$ | $\frac{1}{5}$ | $\frac{1}{5}$ | $\frac{1}{5}$ | $\frac{1}{5}$ | $\frac{1}{5}$ | $\frac{1}{5}$ | $\frac{1}{5}$ | $\frac{1}{5}$ | $\frac{1}{5}$ |

0 ⎯⎯⎯⎯ I ⎯⎯⎯⎯ 2 ⎯⎯⎯⎯ 3

$$\frac{3}{5} \times 4 = \frac{\boxed{}}{5} = \boxed{}\frac{\boxed{}}{5}$$

b) Use the model to help you work out $2 \times \frac{7}{9}$.

| $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ | $\frac{1}{9}$ |

0 ⎯⎯⎯⎯ I ⎯⎯⎯⎯ 2
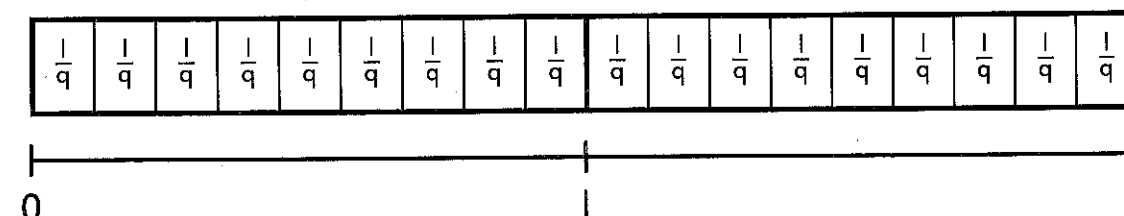
$$2 \times \frac{7}{9} = \frac{\boxed{}}{9} = \boxed{}\frac{\boxed{}}{9}$$

4 Complete these multiplications.

a) $\dfrac{6}{11} \times 5$

c) $\dfrac{3}{4} \times 7$

b) $\dfrac{5}{6} \times 6$

d) $11 \times \dfrac{3}{5}$

5 Max worked out this multiplication. $\boxed{\frac{7}{20} \times 17 = 5\frac{19}{20}}$

Use Max's working to help you with these multiplications.

a) Work out $\frac{7}{20} \times 18$.

b) Work out $\frac{17}{20} \times 7$.

6 Work out the missing numbers.

a) $\frac{3}{7} \times \boxed{} = \frac{33}{7}$

$\frac{3}{7} \times \boxed{} = 4\frac{5}{7}$

c) $\frac{4}{9} \times \boxed{} = 4\frac{4}{9}$

CHALLENGE

b) $\frac{\boxed{}}{8} \times 5 = \frac{25}{8}$

$\frac{\boxed{}}{8} \times 5 = 3\frac{1}{8}$

d) $\boxed{} \times \frac{3}{10} = 3\frac{9}{10}$

Reflect

Explain why $\frac{3}{7} \times 5$ is not equal to $\frac{15}{35}$.

_____

_____

Multiplying fractions **3**

1 A horse eats $2\frac{3}{4}$ carrots each day.

How many carrots does it eat over 3 days?

day 1

day 2

day 3
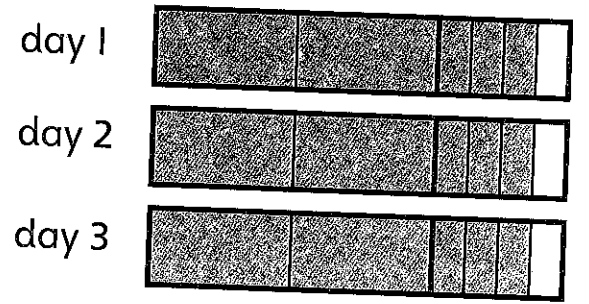
Multiply the wholes:

$\boxed{} \times 3 = \boxed{}$

Multiply the parts:

$\frac{\boxed{}}{\boxed{}} \times 3 = \frac{\boxed{}}{\boxed{}} = \boxed{}\frac{\boxed{}}{\boxed{}}$

$\boxed{} + \boxed{}\frac{\boxed{}}{\boxed{}} = \boxed{}\frac{\boxed{}}{\boxed{}}$

The horse eats $\boxed{}\frac{\boxed{}}{\boxed{}}$ carrots over 3 days.

2 What is $1\frac{3}{8} \times 5$?
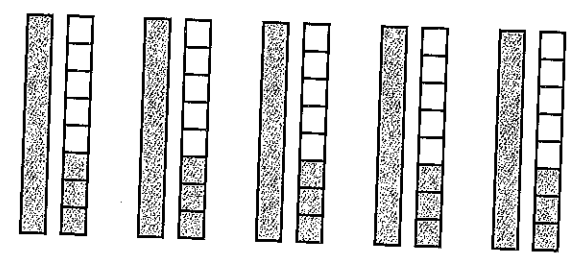
$1\frac{3}{8} \times 5 = \boxed{}\frac{\boxed{}}{\boxed{}}$
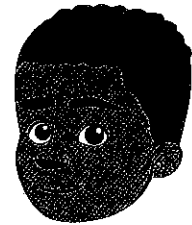
3 Each day Laura runs $3\frac{1}{2}$ km.

How far does she run from Monday to Friday?

Laura runs ⬚ ⬚/⬚ km from Monday to Friday.

4 Do you agree or disagree with Lee? Explain your answer.

> $3\frac{1}{3} \times 4$ is the same as $4\frac{1}{3} \times 3$.

_____

_____

_____

5 Work out these multiplications.
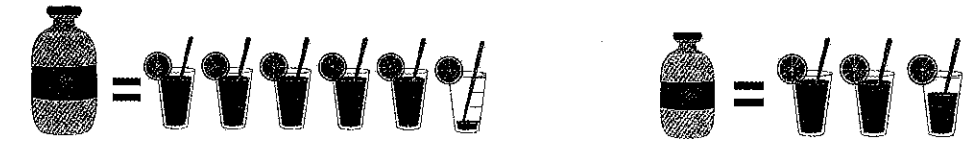
a) $7\frac{2}{5} \times 6$

b) $8\frac{1}{3} \times 6$

6 Reena makes lemonade and pours it into two different sized bottles.

A large bottle holds $5\frac{1}{4}$ glasses.   A small bottle holds $2\frac{3}{4}$ glasses.

CHALLENGE

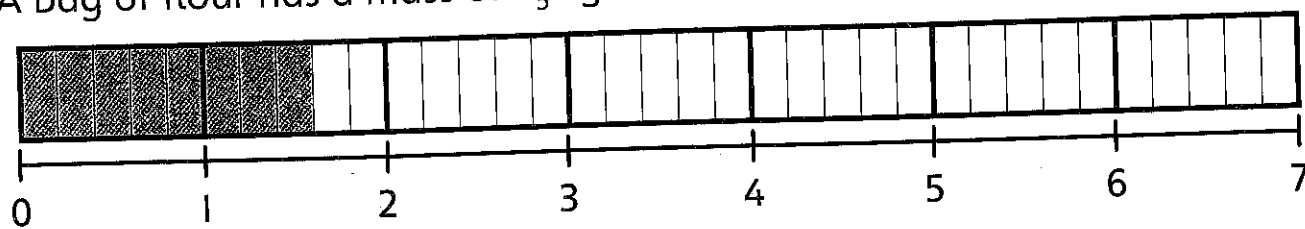Reena fills 3 large bottles and 6 small bottles with her lemonade. How many full glasses of lemonade can be poured?

Reflect

Max says $2\frac{3}{4} \times 5$ is the same as $10\frac{15}{4}$.

Do you agree? What advice would you give to Max?

_____

_____

_____

Multiplying fractions ❹

1 A bag of flour has a mass of $1\frac{3}{5}$ kg.

a) What is the mass of two bags of flour?

$$1\frac{3}{5} = \frac{\boxed{}}{5}$$

$$\frac{\boxed{}}{5} \times 2 = \frac{\boxed{}}{5} = \boxed{}\frac{\boxed{}}{5} \text{ kg}$$

b) What is the mass of 3 bags of flour?

$$\frac{\boxed{}}{5} \times 3 = \frac{\boxed{}}{5} = \boxed{}\frac{\boxed{}}{5} \text{ kg}$$

c) What is the mass of 4 bags of flour?

$$\frac{\boxed{}}{5} \times 4 = \frac{\boxed{}}{5} = \boxed{}\frac{\boxed{}}{5} \text{ kg}$$

2 A box needs $2\frac{1}{4}$ metres of sticky tape to seal.

How much sticky tape is needed to seal 5 boxes?

$\boxed{}\dfrac{\boxed{}}{\boxed{}}$ m of sticky tape is needed to seal 5 boxes.

3 Work out these multiplications.

a) $1\frac{2}{3} \times 3 = \dfrac{\boxed{}}{3} \times 3$

$$= \frac{\boxed{}}{3}$$

$$= \boxed{}$$

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

$$= \frac{\boxed{}}{3}$$

$$= \boxed{}\frac{\boxed{}}{3}$$

c) $1\frac{2}{3} \times 7 = \dfrac{\boxed{}}{3} \times 7$

$$= \frac{\boxed{}}{3}$$

$$= \boxed{}\frac{\boxed{}}{3}$$

d) $10 \times 1\frac{2}{3} = 10 \times \dfrac{\boxed{}}{3}$

$$= \frac{\boxed{}}{3}$$

$$= \boxed{}\frac{\boxed{}}{3}$$

4 **a)** Louise wants to row 12 km in total. She rows $2\frac{7}{10}$ km each day for 5 days.

Does she meet her target? Show your working.

b) Louise cycles $1\frac{2}{3}$ km each day.

How many days will it take her to cycle more than 12 km?

Show your working.