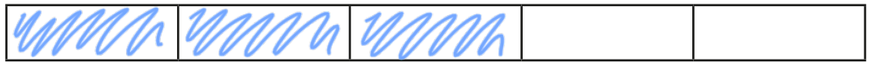
Multiply unit fractions by an integer

1 Complete the calculations.

Use the bar models to help you.

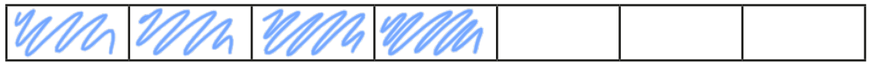
a)



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

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

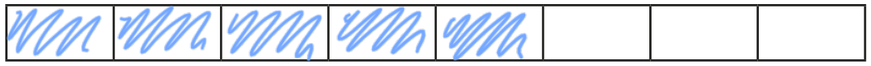
b)



$\frac{1}{7} + \frac{1}{7} + \frac{1}{7} + \frac{1}{7} = \frac{4}{7}$

$4 \times \frac{1}{7} = \frac{4}{7}$

c)



$\frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} = \frac{5}{8}$

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

d)

$\frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} = \frac{7}{10}$

$7 \times \frac{1}{10} = \frac{7}{10}$

2 Complete the multiplications.

a) $3 \times \frac{1}{8} = \frac{3}{8}$

b) $3 \times \frac{1}{10} = \frac{3}{10}$

c) $\frac{1}{8} \times 5 = \frac{5}{8}$

d) $9 \times \frac{1}{10} = \frac{9}{10}$

e) $\frac{1}{5} \times 4 = \frac{4}{5}$

f) $\frac{1}{9} \times 8 = \frac{8}{9}$

g) $8 \times \frac{1}{11} = \frac{8}{11}$

h) $\frac{1}{11} \times 10 = \frac{10}{11}$

3 Match the addition to the equivalent multiplication.

$\frac{1}{3} + \frac{1}{3}$	$2 \times \frac{1}{5}$
$\frac{1}{5} + \frac{1}{5} + \frac{1}{5}$	$\frac{1}{4} \times 3$
$\frac{1}{5} + \frac{1}{5}$	$3 \times \frac{1}{5}$
$\frac{1}{4} + \frac{1}{4} + \frac{1}{4}$	$2 \times \frac{1}{3}$

© White Rose Maths 2019

4 A pizza is cut into sixths.

Jack eats five of the slices.

Write a multiplication to represent this.

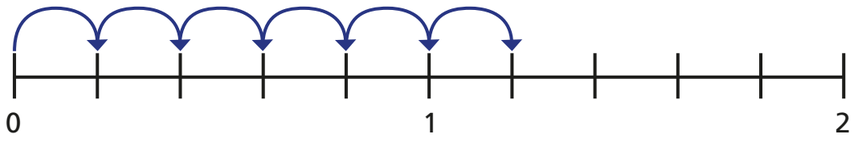
5 × $\frac{1}{6}$ = $\frac{5}{6}$

5 Complete the multiplications.

Use the number lines to help you.

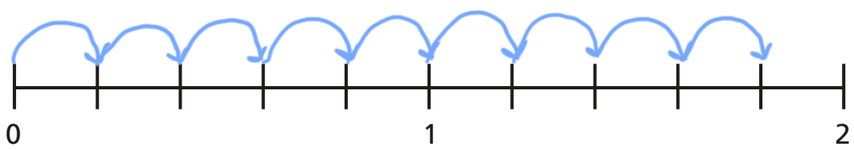
Give each answer as an improper fraction and as a mixed number.

a)



6 × $\frac{1}{5}$ = $\frac{6}{5}$ = $1\frac{1}{5}$

b)



9 × $\frac{1}{5}$ = $\frac{9}{5}$ = $1\frac{4}{5}$

6 Complete the multiplications.

a) 11 × $\frac{1}{10}$ = $\frac{11}{10}$ = $1\frac{1}{10}$

b) 11 × $\frac{1}{9}$ = $\frac{11}{9}$ = $1\frac{2}{9}$

c) $\frac{1}{8}$ × 11 = $\frac{11}{8}$ = $1\frac{3}{8}$

d) 11 × $\frac{1}{7}$ = $\frac{11}{7}$ = $1\frac{4}{7}$

e) 11 × $\frac{1}{6}$ = $\frac{11}{6}$ = $1\frac{5}{6}$

What do you notice?

Does this pattern continue?

7 Complete the calculations.

a) 2 × $\frac{1}{3}$ = $\frac{2}{3}$

b) 3 × $\frac{1}{3}$ = 1

c) 7 × $\frac{1}{7}$ = 1

d) $\frac{1}{7}$ × 10 = $1\frac{3}{7}$

e) $\frac{1}{8}$ × 11 = $1\frac{3}{8}$

f) 7 × $\frac{1}{2}$ = $3\frac{1}{2}$

g) 10 × $\frac{1}{3}$ = $3\frac{1}{3}$

h) $\frac{1}{4}$ × 13 = $3\frac{1}{4}$

© White Rose Maths 2019

Multiply non-unit fractions by an integer

1 Complete the calculations.

Use the bar models to help you.

a)

$\frac{2}{7} + \frac{2}{7} + \frac{2}{7} = \boxed{\frac{6}{7}}$

$3 \times \frac{2}{7} = \boxed{\frac{6}{7}}$

b)

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

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

c)

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

$4 \times \frac{2}{9} = \boxed{\frac{8}{9}}$

d)

$\frac{4}{9} + \frac{4}{9} = \boxed{\frac{8}{9}}$

$2 \times \frac{4}{9} = \boxed{\frac{8}{9}}$

What do you notice about parts c) and d)? Talk to a partner.

2 Complete the multiplications.

a) $2 \times \frac{3}{7} = \boxed{\frac{6}{7}}$

b) $3 \times \frac{3}{11} = \boxed{\frac{9}{11}}$

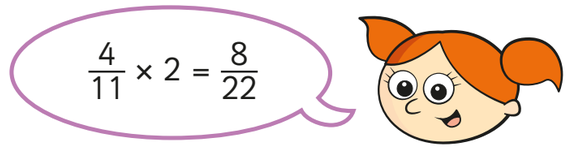
c) $\frac{2}{11} \times 4 = \boxed{\frac{8}{11}}$

d) $5 \times \frac{2}{11} = \boxed{\frac{10}{11}}$

e) $\frac{2}{15} \times 7 = \boxed{\frac{14}{15}}$

f) $\frac{7}{15} \times 2 = \boxed{\frac{14}{15}}$

3



Explain the mistake that Alex has made.

She has multiplied both the numerator and the denominator.

$\frac{4}{11} \times 2 = \frac{8}{11}$

4 A cat eats $\frac{2}{15}$ of a bag of biscuits a day.

What fraction of the bag does the cat eat in 4 days?

The cat eats $\boxed{\frac{8}{15}}$ of the bag in 4 days.

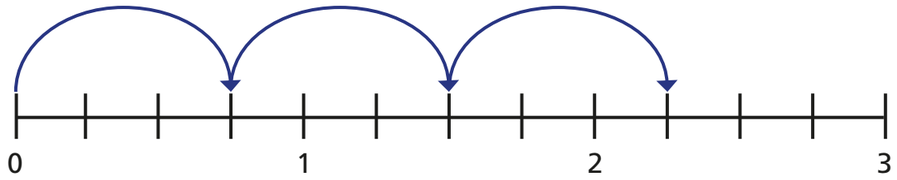
© White Rose Maths 2019

5 Complete the multiplications.

Use the number lines to help you.

Give each answer as an improper fraction and as a mixed number.

a)

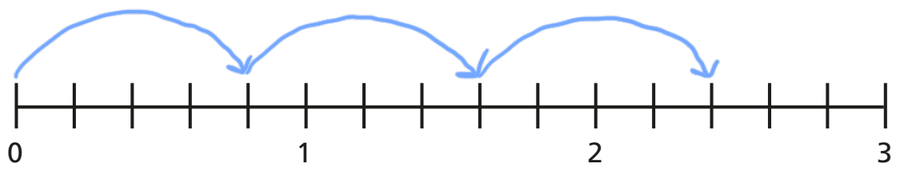


$3 \times \frac{3}{4} = \boxed{\frac{9}{4}} = \boxed{2\frac{1}{4}}$

b)

$4 \times \frac{3}{5} = \boxed{\frac{12}{5}} = \boxed{2\frac{2}{5}}$

c)



$3 \times \frac{4}{5} = \boxed{\frac{12}{5}} = \boxed{2\frac{2}{5}}$

6 Complete the multiplications.

a) $5 \times \frac{2}{3} = \boxed{\frac{10}{3}} = \boxed{3\frac{1}{3}}$

b) $4 \times \frac{4}{5} = \boxed{\frac{16}{5}} = \boxed{3\frac{1}{5}}$

c) $\frac{2}{7} \times 11 = \boxed{\frac{22}{7}} = \boxed{3\frac{1}{7}}$

d) $4 \times \frac{7}{9} = \boxed{\frac{28}{9}} = \boxed{3\frac{1}{9}}$

e) $17 \times \frac{2}{11} = \boxed{\frac{34}{11}} = \boxed{3\frac{1}{11}}$

f) Describe the pattern you can see in the answers.

g) What could the next multiplication in the pattern be?

Write two possible options.

e.g. $\frac{5}{13} \times 8$

$10 \times \frac{4}{13}$

7 Here are some digit cards.

1	3	5	7

Use the digit cards to complete the multiplication.

$\boxed{5} \times \frac{\boxed{3}}{8} = \frac{15}{8} = \boxed{1}\frac{\boxed{7}}{8}$

© White Rose Maths 2019

Multiply mixed numbers by integers

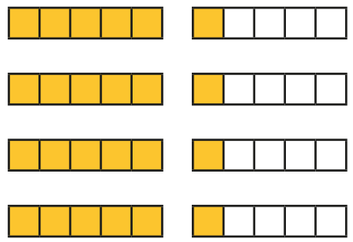
1 Complete the calculations.

a) $4 \times 1\frac{1}{5}$

$4 \times 1 =$ 4

$4 \times \frac{1}{5} =$ $\frac{4}{5}$

4 + $\frac{4}{5}$ = $4\frac{4}{5}$

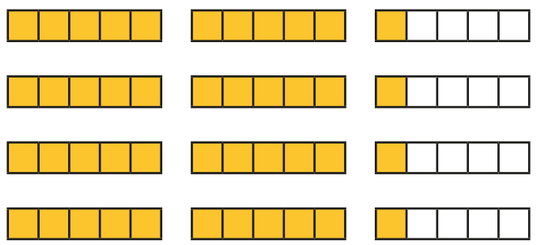


b) $4 \times 2\frac{1}{5}$

4 × 2 = 8

$4 \times \frac{1}{5} = \frac{4}{5}$

8 + $\frac{4}{5}$ = $8\frac{4}{5}$

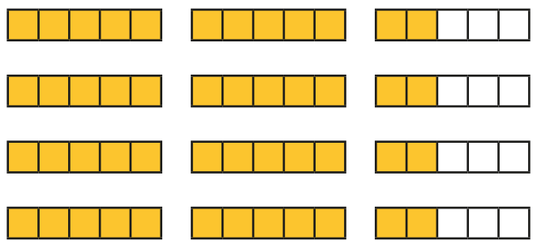


c) $4 \times 2\frac{2}{5}$

4 × 2 = 8

$4 \times \frac{2}{5} = \frac{8}{5} = 1\frac{3}{5}$

8 + $1\frac{3}{5}$ = $9\frac{3}{5}$

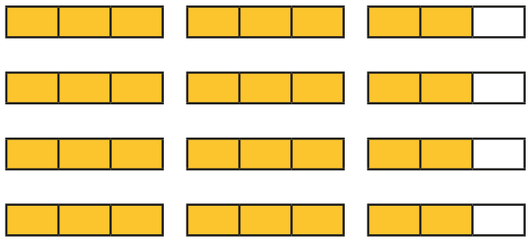


d) $4 \times 2\frac{2}{3}$

4 × 2 = 8

$4 \times \frac{2}{3} = \frac{8}{3} = 2\frac{2}{3}$

8 + $2\frac{2}{3}$ = $10\frac{2}{3}$



2 Complete the multiplications.

a) $3 \times 8\frac{2}{7} =$ $24\frac{6}{7}$

b) $2 \times 12\frac{2}{11} =$ $24\frac{4}{11}$

c) $6\frac{2}{11} \times 4 =$ $24\frac{8}{11}$

d) $4 \times 6\frac{3}{19} =$ $24\frac{12}{19}$

e) $2\frac{2}{25} \times 12 =$ $24\frac{24}{25}$

f) $3\frac{1}{15} \times 8 =$ $24\frac{8}{15}$

What is the same and what is different about your answers?

They all contain 24 wholes but the fraction is different

3 One bag of potatoes weighs $1\frac{3}{4}$ kg.

How much do 5 bags of potatoes weigh?

$8\frac{3}{4}$ kg

© White Rose Maths 2019

4 Complete the calculations.

a) $5 \times 2\frac{2}{3} = 10 + \frac{10}{3} =$ $13\frac{1}{3}$

b) $4\frac{3}{7} \times 5 = 20 +$ $\frac{15}{7}$ = $22\frac{1}{7}$

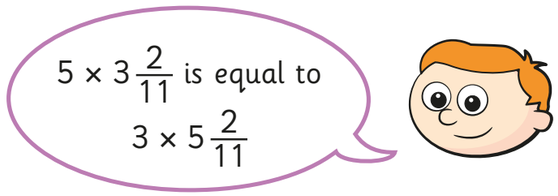
c) $8 \times 2\frac{5}{12} =$ 16 + $\frac{40}{12}$ = $19\frac{1}{3}$

d) $7 \times 3\frac{1}{5} =$ 21 + $\frac{7}{5}$ = $22\frac{2}{5}$

e) $4\frac{2}{9} \times 8 =$ 32 + $\frac{16}{9}$ = $33\frac{7}{9}$

f) $11 \times 4\frac{3}{10} =$ 44 + $\frac{33}{10}$ = $47\frac{3}{10}$

5



Do you agree with Ron? No

Explain why.

$5 \times 3\frac{2}{11} = 15\frac{10}{11}$

$3 \times 5\frac{2}{11} = 15\frac{6}{11}$

6 Eva drinks $3\frac{1}{3}$ litres of water a day.

How many litres of water does she drink in a week?

$23\frac{1}{3}$ l

7 Here is a recipe for a birthday cake.

Butter $1\frac{3}{8}$ kg

Sugar $1\frac{5}{16}$ kg

Self-raising flour $2\frac{1}{4}$ kg

6 eggs

a) How much flour is needed for 3 birthday cakes?

$6\frac{3}{4}$ kg

b) Dora makes 4 birthday cakes.

How much more butter does she use than sugar?

$\frac{1}{4}$ kg

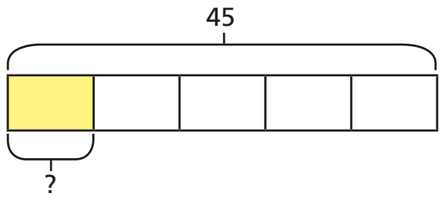
© White Rose Maths 2019

Fractions of an amount

1 Annie and Mo are finding fractions of amounts.

a) Annie is trying to find $\frac{1}{5}$ of 45

She draws this bar model.

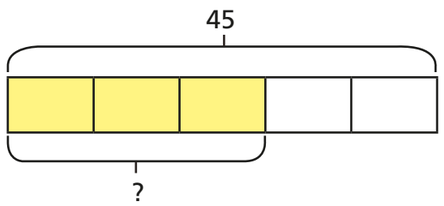


How does the bar model represent the calculation?

What is $\frac{1}{5}$ of 45?

9

b) Mo is trying to find $\frac{3}{5}$ of 45



How does the bar model represent the calculation?

What is $\frac{3}{5}$ of 45?

27

c) What is the same and what is different about Mo and Annie's questions?

2 Complete the calculations.

a) $\frac{1}{3}$ of 27 = 9 **b)** $\frac{1}{3}$ of 72 = 24 **c)** $\frac{1}{3}$ of 90 = 30

$\frac{2}{3}$ of 27 = 18 $\frac{1}{6}$ of 72 = 12 $\frac{2}{6}$ of 90 = 30

$\frac{3}{3}$ of 27 = 27 $\frac{1}{12}$ of 72 = 6 $\frac{3}{9}$ of 90 = 30

What patterns do you notice?

3 Match the calculations to the correct amounts.

$\frac{5}{8}$ of 48	32
$\frac{2}{3}$ of 48	40
$\frac{5}{6}$ of 48	30
$\frac{3}{4}$ of 48	36

© White Rose Maths 2019

4 Write <, > or = to compare the calculations.

a) $\frac{5}{7}$ of 56 > $\frac{5}{8}$ of 56

b) $\frac{4}{7}$ of 56 < $\frac{5}{8}$ of 56

c) $\frac{2}{3}$ of 63 > $\frac{5}{8}$ of 64

d) $\frac{7}{10}$ of 350 < $\frac{5}{7}$ of 350

5 165 children and adults go on a school trip.

Two thirds of the people are children.

a) How many adults are on the school trip?

55

b) $\frac{3}{5}$ of the children are boys.

How many boys are on the school trip?

66

c) $\frac{7}{10}$ of the children have an apple for lunch.

How many children do **not** have an apple for lunch?

33

6 Tick the odd one out.

$\frac{3}{4}$ of 80	$\frac{3}{8}$ of 160	$\frac{2}{3}$ of 90	$\frac{3}{4}$ of 100

Explain your choice.

Various answers.

7 320 people were asked about their favourite flavour of ice cream.

Here is a pictogram showing the results.

vanilla	
strawberry	
chocolate	
mint choc chip	

a) How many people chose mint choc chip?

112

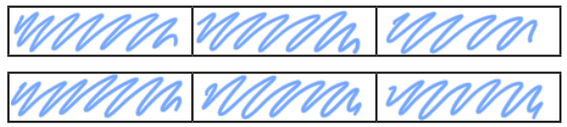
b) How many more people chose vanilla than chocolate?

32

© White Rose Maths 2019

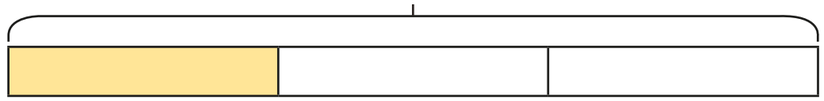
Fractions as operators

1 **a)** Work out $\frac{1}{3} \times 6$



$\frac{1}{3} \times 6 = \frac{6}{3} = 2$

b) Work out $\frac{1}{3}$ of 6



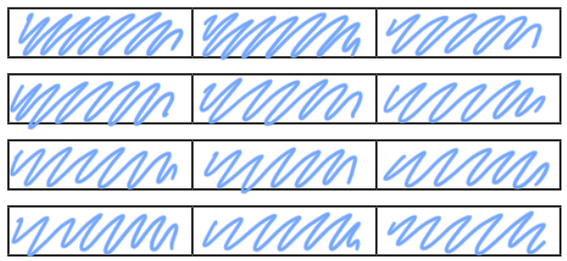
$\frac{1}{3}$ of 6 = 6 ÷ 3 = 2

c) What is the same about these calculations?

d) Work out $\frac{2}{3}$ of 6

$\frac{2}{3}$ of 6 = 6 ÷ 3 × 2 = 4

e) Work out $\frac{2}{3} \times 6$



$\frac{2}{3} \times 6 = \frac{12}{3} = 4$

2 Complete the calculations.

a) $\frac{1}{3} \times 12 = 4$

$\frac{1}{3}$ of 12 = 4

b) $12 \times \frac{1}{4} = 3$

$\frac{1}{4}$ of 12 = 3

c) $12 \times \frac{2}{3} = 8$

$\frac{2}{3}$ of 12 = 8

d) $\frac{3}{4} \times 12 = 9$

$\frac{3}{4}$ of 12 = 9

What do you notice?

3 Tick the calculation in each pair that is easier to work out.

a)	$\frac{1}{5} \times 7$ ✓	$\frac{1}{5}$ of 7
b)	$\frac{1}{5} \times 10$	$\frac{1}{5}$ of 10 ✓
c)	$\frac{3}{5} \times 10$	$\frac{3}{5}$ of 10 ✓
d)	$\frac{3}{10} \times 5$ ✓	$\frac{3}{10}$ of 5

Compare answers with a partner.

© White Rose Maths 2019

4 Complete the calculations.

a) $\frac{5}{6} \times 12 = \frac{5}{6}$ of 12 = 10

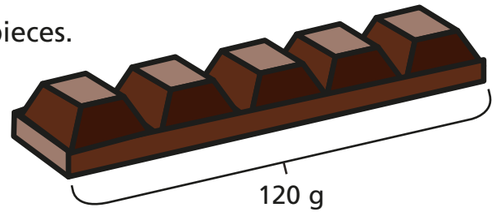
b) $\frac{3}{4} \times 24 = \frac{3}{4}$ of 24 = 18

c) $\frac{2}{7} \times 28 = \frac{2}{7}$ of 28 = 8

d) $\frac{4}{5} \times 45 = \frac{4}{5}$ of 45 = 36

5 A bar of chocolate has 5 equal pieces.

The whole bar weighs 120g.



How much do three pieces weigh?

a) Write two calculations that will give the answer to the problem.

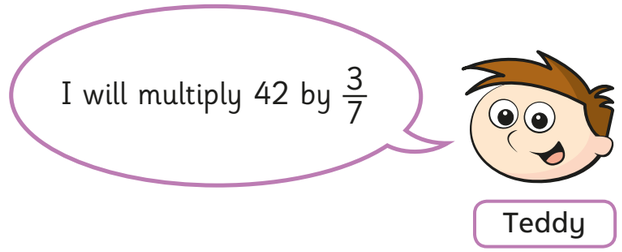
$\frac{3}{5}$ of 120 $\frac{3}{5} \times 120$

b) Work out the answer.

Three pieces of chocolate weigh 72g

6 Teddy and Annie are working out $\frac{3}{7} \times 42$

a)

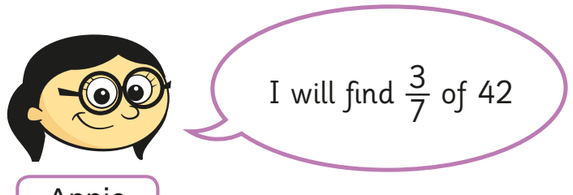


Use Teddy's method to work out the calculation.

$42 \times \frac{3}{7} = \frac{126}{7} = 18$

18

b)



Use Annie's method to work out the calculation.

18

c) Whose method do you prefer? _____

Explain why.

Various answers

d) When is it easier to find fractions of amounts rather than multiply fractions?

Give some examples for each method.

© White Rose Maths 2019