Maths this Week

Maths this week is to try and get you thinking.

In the middle of each card is a problem in its simplest form and more complicated questions around the outside.

Once you have completed the simplest question, have a go at the questions around the outside. When you are answering the other questions, think about how the questions have changed and what that has made you have to do differently.

CARD 16

272 people attend a school brass band competition. There are 223 children and 16 teachers, the rest are parents.

How many parents are there?

286 children enter the brass band competition.
There are 27 teachers who accompany them and 19 parents.
How many people visit the museum altogether?

What if...

...the proportion of adults changes?

It costs £30 for adults to attend the brass band competition and £15 for children.
The venue takes £675 in ticket sales.
A minimum of 5 adults and a minimum of 25 children attend.
What combination of adult and child tickets could they have sold?

272 people attend a school brass band competition.
There are 223 children and 16 teachers, the rest are parents.
How many parents are there?
$\frac{1}{3}$ of the parents are dads.
How many dads are there?

272 people attend a school brass band competition.
There are 223 children and 16 teachers, the rest are parents.
$\frac{1}{3}$ of the parents are dads.
How many dads are there?

5 children are accompanied by 1 adult when entering the brass band competition.
Charlie says, 'If 100 children attend there will be 15 adults.'
Is he correct?
Explain how you know.

What if...
Less straight forward
Finding all possibilities
Explain
Instructions left out
More steps
Simple
Scaling +/– fractions money multiples

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$286 + 27 + 19 = 332$

One possible approach...

The number of adults reduces by $\frac{1}{3}$.

No. of tickets	Adults £30	No. of tickets	Children £15
5	£150	35	£525
6	£180	33	£495
7	£210	31	£465
8	£240	29	£435
9	£270	27	£405
10	£300	25	£375

Describe the repeating pattern.

There are 33 parents.

$272 - 223 = 49$

$49 - 16 = 33$

There are 33 parents.

$272 - 223 = 49$

$49 - 16 = 33$

$33 \div 3 = 11$ dads.

There are 33 parents.

$272 - 223 = 49$

$49 - 16 = 33$

$33 \div 3 = 11$ dads.

He is not correct.

$2 \times 5 = 10$ therefore

$20 \times 5 = 100$

20 adults would be needed.

CARD 17

Farmer Phil has just bought a new herd of cows and needs to erect a fence around one of his fields for them to live in.

The field has 5 equal sides each measuring 459m.
How much fencing does he need to buy?

A field with 5 equal sides has a fenced perimeter of 2895m.
How long is each side?

What if...

...the sides of the field vary in length?

Farmer Phil builds a rectangular pen for his sheep with 2 pairs of equal sides.
Each side must be a multiple of 50.
He uses 800m of fencing.
What lengths could the sides be?
Find all possibilities.

Farmer Phil has just bought a new herd of cows and needs to erect a fence around one of his fields for them to live in.
The field has 5 equal sides each measuring 459m.
How much fencing does he need to buy?
How much fencing will be left over from 3000m?

Farmer Phil has just bought a new herd of cows and needs to erect a fence around one of his fields for them to live in.
The field has 5 equal sides each measuring 459m.
How much fencing will be left over from 3000m?

Farmer Phil has to build a fence that has a perimeter of 450m.
He says this is ten times longer than a 4.5m field gate.
Is he correct?
Explain how you know.

What if...

Less straight forward

Finding all possibilities

Explain

Instructions left out

More steps

Simple

Measures – perimeter
x 10/100
x multiples of 50
mental ÷

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2895 ÷ 10

289.5 x 2 = 579m

One possible approach...

A rectangular field has sides in length in the ratio of 3 : 2.

Shorter sides	Longer sides
2 x 50m	2 x 350m
2 x 100m	2 x 300m
2 x 150m	2 x 250m

459 x 5 = 2295m

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3000m – 2295m = 705m of fencing will be left over.

459 x 5 = 2295m

3000m – 2295m = 705m
of fencing will be left over.

Farmer Phil is wrong.

450m is 100 times longer than 4.5m
not 10 times longer.

CARD 18

Amelie has English and Maths homework each week. It takes her a total of $2\frac{1}{2}$ hours to complete all of her homework. How long is this in minutes?

Amelie spends 30 minutes doing her Maths homework, 40 minutes on her English and 75 minutes on her Spanish.
How long does it take Amelie to complete all of her homework in hours and minutes?

What if...

...she had different amount of homework and different amounts of time to spend on it?

Amelie spends 1 hour and 40 minutes doing her homework.
She has two pieces to complete.
It takes a minimum of 20 minutes for each piece.
The time taken to complete each task is a multiple of 20 minutes.
How long could each piece take to complete?
Find different possibilities.

Amelie has English and Maths homework each week.
It takes her a total of $2\frac{1}{2}$ hours to complete all of her homework.
How long is this in minutes?
She spends 80 minutes on her English homework.
How much time in hours and minutes does she spend doing her Maths homework.

Amelie has English and Maths homework each week.
It takes her a total of $2\frac{1}{2}$ hours to complete all of her homework.
She spends 80 minutes on her English homework.
How much time in hours and minutes does she spend doing her Maths homework?

It takes Amelie 2 hours and 15 minutes to complete her homework.
Amelie says, if she starts at 6.20pm she will be finished before 8:40pm.
Is she correct?
Explain how you know.

What if...
Less straight forward
Finding all possibilities
Explain
Instructions left out
More steps
Simple
Time mental + (near doubling) mental + converting mins to hours

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30 + 40 + 75 = 145 minutes.

or

2 hours and 25 minutes.

One possible approach...

Amelie has double the amount of homework and ? hours/minutes to complete it.

Piece 1	Piece 2
20 mins	1 hour 20 mins
40 mins	1 hour
1 hour	40 mins
1 hour 20 mins	20 mins

150 minutes
1 hour = 60 x 2 = 120 minutes.

Half an hour = 30 minutes.
120 + 30 = 150 minutes.

150 minutes
1 hour = 60 x 2 = 120 minutes
Half an hour = 30 minutes
120 + 30 = 150 minutes in total.
150 mins – 80 mins = 70 mins.
She spends 70 mins, which is 1 hour and 10 minutes, on her Maths homework.

150 minutes
1 hour = 60 x 2 = 120 minutes
Half an hour = 30 minutes
120 + 30 = 150 minutes in total.
150 mins – 80 mins = 70 mins.

She spends 70 mins, which is 1 hour and 10 minutes, on her Maths homework.

Yes she is correct because 2 hours and 15 minutes after she started will be before 8.40pm.

It will be 8.35pm.

CARD 19

There are 75 pupils.
$\frac{3}{5}$ of the pupils support Manchester United and the remainder support Manchester City.
What fraction of children supports Manchester City? How many pupils support Manchester City?

$\frac{1}{6}$ of a class support Manchester United.
$\frac{2}{6}$ of a class support Manchester City.
The rest of the class support Liverpool.
What fraction of children supports Liverpool?

What if...

...you choose the number of supporters and proportions?

In a class of 24 pupils, different football teams are supported.
What equal proportion of pupils could support a different team?
How many possible numbers of football teams could there be?
Find different solutions.

There are 75 pupils.
$\frac{3}{5}$ of the pupils support Manchester United and the remainder support Manchester City.
What fraction of children supports Manchester City?
How many pupils support Manchester City?
If $\frac{1}{10}$ of the City supporters converted to United supporters, how many City fans would be left?

There are 75 pupils.
$\frac{3}{5}$ of the pupils support Manchester United and the remainder support Manchester City.
If $\frac{1}{10}$ of the City supporters converted to United supporters.
How many city fans would there be?

There are 36 children in Jennifer's class.
8 children support Manchester City.
Jennifer says that this is $\frac{1}{3}$ of the class.
Frankie says that 8 is less than $\frac{1}{3}$.
Who is correct?
Explain how you know.

What if...
Less straight forward
Finding all possibilities
Explain
Instructions left out
More steps
Simple

Fractions of quantities
equivalent fractions
+ and – of non-unit fractions

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$\frac{3}{6}$ or $\frac{1}{2}$ support Liverpool.

24 children	
Number of teams	Proportion of children
2	$\frac{1}{2}$
3	$\frac{1}{8}$
4	$\frac{1}{6}$
6	$\frac{1}{4}$
8	$\frac{1}{3}$
12	$\frac{1}{12}$
24	$\frac{1}{24}$

One possible approach...

$\frac{3}{8}$ of the ? pupils support Manchester United.

$\frac{1}{5} = 75 \div 5 = 15$

$\frac{3}{5} = 3 \times 15 = 45$ United supporters.

$\frac{2}{5} = 2 \times 15 = 30$ City supporters.

$\frac{1}{5} = 75 \div 5 = 1$

$\frac{3}{5} = 3 \times 15 = 45$ United supporters.

$\frac{2}{5} = 2 \times 15 = 30$ City supporters.

$\frac{1}{10}$ of 30 City supporters = 3.

30 – 3 = 27

27 City fans would be left.

$\frac{1}{5} = 75 \div 5 = 15$

$\frac{3}{5} = 3 \times 15 = 45$ United supporters.

2 x 15 = 30 City supporters.

$\frac{1}{10}$ of 30 City supporters = 3.

30 – 3 = 27

27 City fans would be left.

Frankie is correct.

$\frac{1}{3}$ of 36 is 12.

He is correct because 8 is less than 12.

10 dogs at a dog show, a third of the total, were poodles.
15 dogs, a half of the total, were sausage dogs.
How many dogs in total were at the dog show?

What if...

...the number of dogs at the show changed?

CARD 20

At the dog show there are 46 dogs in total.
10 of the dogs are poodles.
How many dogs are not poodles?
$\frac{1}{2}$ of the dogs that are not poodles are sausage dogs.
How many sausage dogs are there?

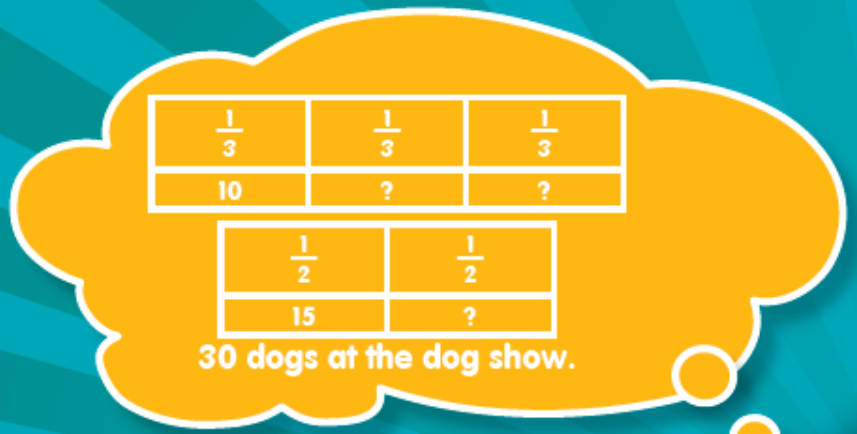
At the dog show half of the dogs are poodles.
A third of the dogs are sausage dogs.
The remainder are Labradors.
There are at least 12 dogs but no more than 60 in total.
How many different numbers of each dog could there be?

At the dog show there are 46 dogs in total.
10 of the dogs are poodles.
How many dogs are not poodles?
$\frac{1}{2}$ of the dogs that are not poodles are sausage dogs.
How many sausage dogs are there?
$\frac{1}{3}$ of the dogs left are terriers.
How many dogs are terriers?

At the dog show there are 46 dogs in total.
10 of the dogs are poodles.
$\frac{1}{2}$ of the dogs that are not poodles are sausage dogs.
$\frac{1}{3}$ of the dogs left are terriers.
How many dogs are terriers?

There are 48 dogs at the dog show.
$\frac{1}{3}$ are sausage dogs.
$\frac{1}{4}$ are poodles.
The presenter says that poodles are more popular than sausage dogs.
Is he correct?
Explain how you know.

tts
MA03177



The key to unlocking this problem is reasoning about halves and thirds and therefore the total number of dogs must be a multiple of 3 and 2 (even).			
No of dogs	P = half	S = third	Labs what's left
12	6	4	2
18	9	6	3
24	12	8	4
30	15	10	5
What patterns can be seen? Can these be used to predict all possibilities?			

46 – 10 = 36

36 dogs are not poodles.

Half of 36 = 18.

There are 18 sausage dogs.

One possible approach...

The total number of dogs more than doubles and $\frac{2}{5}$ of them are poodles, etc.

46 – 10 = 36

36 dogs are not poodles.

A half of 36 = 18.

There are 18 sausage dogs.

A third of 18 = 6.

6 dogs are terriers.

46 – 10 = 36

36 dogs are not poodles.

A half of 36 = 18.

There are 18 sausage dogs.

A third of 18 = 6 are terriers.

He is not correct because $\frac{1}{4}$ is smaller than $\frac{1}{3}$

e.g.

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

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