APSMO

WEDNESDAY 4 SEPTEMBER 2024

MATHS EXPLORER 4

Suggested Time: ***30 Minutes***

4A. **Netball Game**

Emma invited her cousin and 4 team mates to come with her to watch a netball game.

Her cousin invited his 2 brothers to join them.

Half of her team mates invited 3 more friends to come.

One of these friends couldn't make it.

How many people came with Emma to watch the game?

4B. **Parcels**

Patrick drives his truck around the city, delivering parcels.

At his first stop, he delivered half of his parcels.

Then he delivered 7 parcels to the school.

His next stop was a hotel where he delivered 4 parcels.

When Patrick stopped for lunch he had one parcel in his truck.

How many did he have in his truck at the beginning of the day?

4C. **Fence Posts**

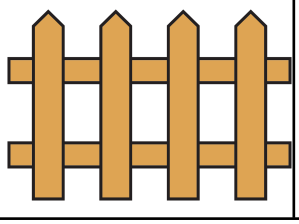
Farmer Ashley puts 28 new fence posts around a rectangle shaped paddock.

First, he puts a fence post in each corner of the paddock.

Then he puts the rest of the posts along the sides.

The longer sides each have 4 more posts than the shorter sides.

How many fence posts are there on a longer side?



Write your answers in the boxes on the back.

Keep your answers hidden by folding backwards on this line.

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MATHS EXPLORER

WEDNESDAY 4 SEPTEMBER 2024

MATHS EXPLORER 4

Student Name:

4A.

4B.

4C.

Fold Here. Keep your answers hidden.

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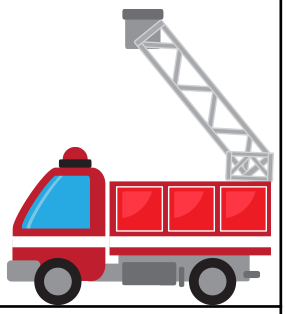
MATHS EXPLORER 4

Suggested Time: ***30 Minutes***

4D. A Firefighter's Ladder

A firefighter stood on the middle rung of a ladder.
He went up 3 rungs, was forced down 5 rungs, and then went up 7 rungs to extinguish the fire.
Then the firefighter climbed the remaining 2 rungs to the top of the ladder.
How many rungs are there on the entire ladder?



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4E. Elke's Money

Altogether, Brian, Skye, Elke and Oliver have $48.
Oliver has $6 more than Skye.
Skye has one quarter of the money.
Together, Brian and Skye have the same amount of money as Oliver.
How much money does Elke have?

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MATHS EXPLORER 4

Student Name:

4D.

4E.

Fold Here. Keep your answers hidden.

Maths Challenger #1

For distribution **if** a group have **completed** Paper 4 and there is remaining time.
These questions are **not recorded** in the Members Portal.

Bob the Tiler

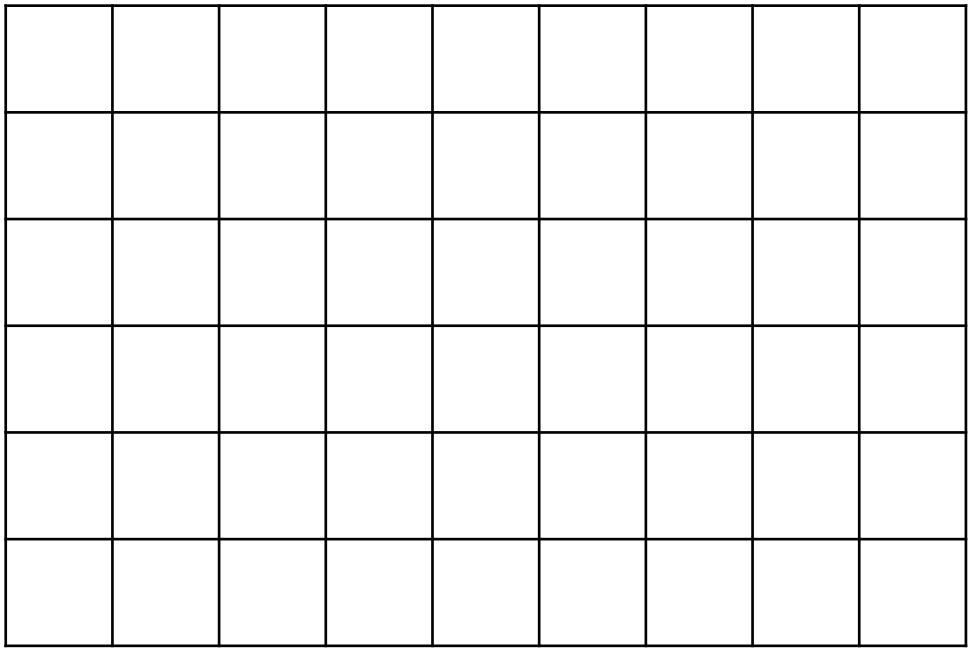
Bob is tiling a 6 metre × 9 metre floor.

He has three sizes of rectangular tile:

1 m × 2 m, 2 m × 3 m, and 3 m × 4 m.

No tiles may be cut.

What is the least number of tiles Bob could use to tile the floor?



Write your answer in this box.

Maths Challenger #2

For distribution **if** a group have **completed** Paper 4 and there is remaining time.
These questions are **not recorded** in the Members Portal.

Coloured Cups

There are 5 different coloured cups in a row.

The green cup is to the left of the red cup (but not necessarily next to it).

The yellow cup is to the left of the purple cup (but not necessarily next to it).

The blue cup is on one end of the row of cups.

For all 3 statements to be true, in how many different ways could these 5 cups be arranged?

Write your answer in this box.

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MATHS EXPLORER 4

4A: 12	**4B:** 24	**4C:** 10	**4D:** 15	**4E:** $12

4A. Netball Game

The question is:

Emma invited her cousin and 4 team mates to come with her to watch a netball game.

Her cousin invited his 2 brothers to join them.

Half of her team mates invited 3 more friends to come. One of these friends couldn't make it.

How many people came with Emma to watch the game?

Strategy: Draw a Diagram

We can draw a diagram to track and record the number of people invited to the netball game.

Emma invited **4 team mates** and her **cousin**.

These people and invites are shown in purple.

Emma's cousin invited **2** more people (his brothers) to join them. His brothers are shown in green.

Half of her team mates invited 3 more friends.

These people and invites are shown in green.

One of these friends couldn't come.

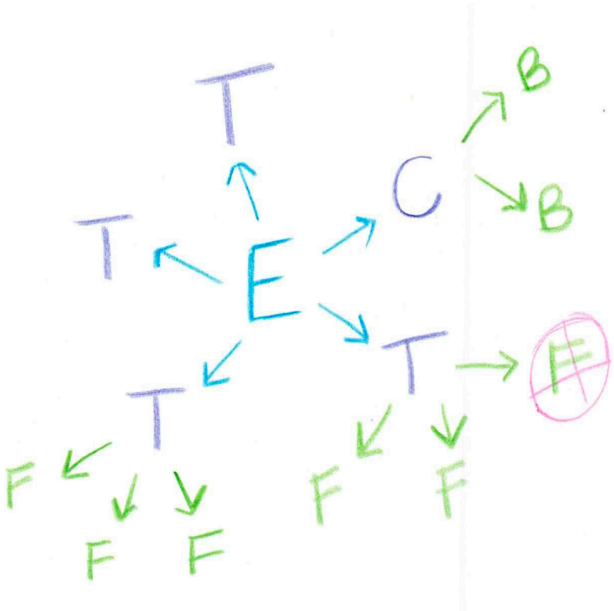
Emma invited her cousin and 4 team mates: **5 people.**

Her cousin invited 2 more people: **2 people.**

Half of her team mates invited 3 friends: **6 people.**

One of these friends couldn't make the game.

5 + **2** + **6** − **1** = **12 people** came with Emma to watch the game.



Strategy: Build a Table

We can build a table to list and count the number of people invited to the netball game.

Step 1: Emma invited:					Tally
Cousin	Team Mate	Team Mate	Team Mate	Team Mate	5
Step 2: Her cousin and team mates invited:					
Brother Brother	Friend Friend Friend	Friend Friend Friend			8
Step 3: One friend couldn't come:					-1
				Total:	**12**

Altogether, **12 people** were invited to the netball game.

4B. **Parcels**

Patrick drives his truck around the city, delivering parcels.

At his first stop, he delivered half of his parcels.

Then he delivered 7 parcels to the school.

His next stop was a hotel where he delivered 4 parcels.

When Patrick stopped for lunch he had one parcel in his truck.

How many did he have in his truck at the beginning of the day?

Strategy: Working Backwards

We can solve this problem by working backwards.

We can follow the steps of the problem until Patrick has 1 parcels, and then trace the steps backwards to find out the number that he started with.

Patrick **delivered half of the packages at the first stop.** We divide the packages in 2.

He then delivered **7 parcels to the school** and then **4 parcels to a hotel.**

Patrick was left with 1 parcel at lunchtime.

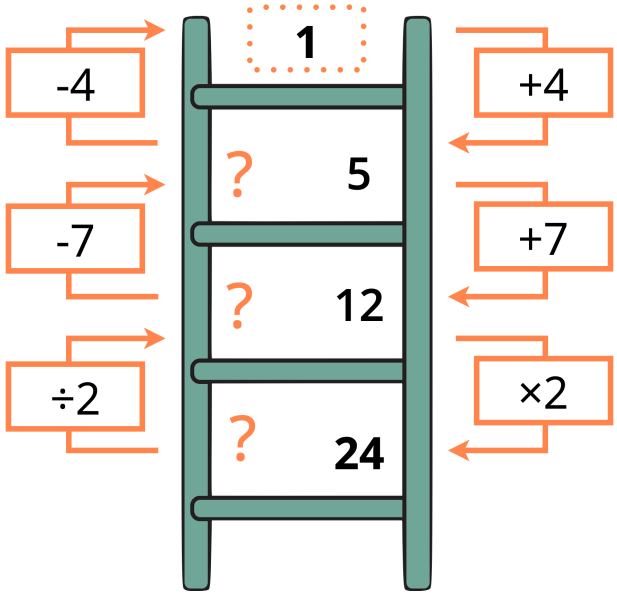
Let's **work backwards**.

Add back the 4 parcels from the hotel and then **add back the 7 parcels from the school.**

This makes **12 parcels.**

Double the 12 parcels to find out how many there were at the beginning of the day.

Patrick started the day with **24** parcels in his truck.



4C. Fence Posts

Farmer Ashley puts 28 new fence posts around a rectangle shaped paddock. First, he puts a fence post in each corner of the paddock. Then he puts the rest of the posts along the sides. The longer sides each have 4 more posts than the shorter sides. How many fence posts are there on a longer side?

Strategy: Draw a Diagram

Draw a rectangle and put a fence post in each corner.

This leaves **24** fence posts.

The longer sides have **4** more posts that the shorter sides.

Add these to the diagram, putting **4** posts on each long side.

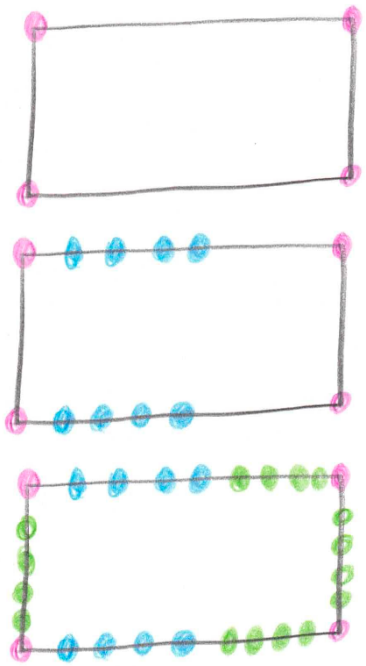
This leaves **16** fence posts.

Share the remaining **16** fence posts evenly between the sides.

There are **4** for each side

All **28** fence posts have been used.

There are **10** fence posts on a longer side.



Strategy: Build a Table

Start with a column to show the 4 corner posts. Then include a column with the number of posts on longer sides (excluding the corner posts) and a column showing the number of posts on shorter sides (excluding the corner posts).

We can see in the table that when there are **28** posts around the paddock, the longer sides have 8 posts each, excluding the corner post.

8 posts, plus the 2 corner posts, makes a total of 10 posts each.

8 + 2 = **10 posts.**

Corners	Longer Sides (Excluding corners)	Shorter Sides (Excluding corners)	Total:
4	5 + 5	1 + 1	**16**
4	6 + 6	2 + 2	**20**
4	7 + 7	3 + 3	**24**
4	8 + 8	4 + 4	**28**
4	9 + 9	5 + 5	**32**

4D. **A Firefighter's Ladder**

A firefighter stood on the middle rung of a ladder.
He went up 3 rungs, was forced down 5 rungs, and then went up 7 rungs to extinguish the fire.
Then the firefighter climbed the remaining 2 rungs to the top of the ladder.
How many rungs are there on the entire ladder?

Strategy: Draw a Diagram (version 1)

Draw a thick line on the ladder to mark the middle.

First, the firefighter went up **3** rungs.

Move up the ladder and **add 3 rungs** above the middle.

(Move shown in **blue**)

Then the firefighter was forced down **5** rungs.

(Move shown in **pink**)

Move down the ladder 5 rungs. **Add in 2 rungs below** the middle rung.

Then the firefighter went up **7** rungs to extinguish the fire.

(Move shown in **green**)

He is now 5 rungs above the middle rung.

Finally, the firefighter climbed **2** rungs to the top of the ladder.

Move up 2 and add 2 rungs to the ladder.

(Move shown in **orange**)

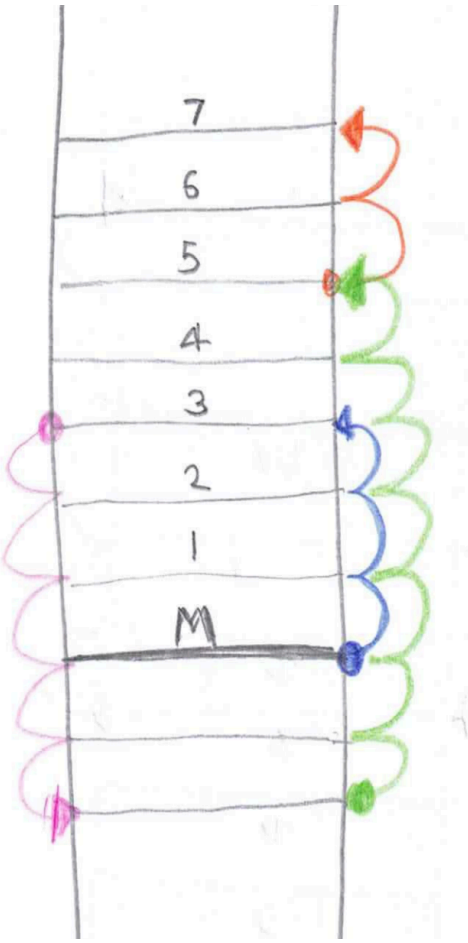
He is now **7** rungs above the middle rung.

The middle rung must have an equal number of rungs below it as above it.

This means there must be **7** rungs below the middle rung.

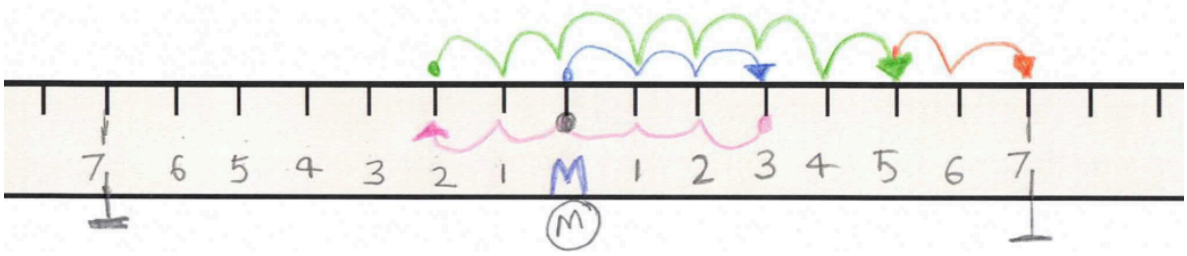
Add these to the middle rung to find the total number.

7 + 7 + 1 = **15**



Strategy: Draw a Diagram (Numberline)

A horizontal number line, such as a ruler, can also be used to follow the same steps.



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4E. Elke's Money

Altogether, Brian, Skye, Elke and Oliver have $48.

Oliver has $6 more than Skye.

Skye has one quarter of the money.

Together, Brian and Skye have the same amount of money as Oliver. How much money does Elke have?

Strategy: Use Logical Reasoning

We know that altogether, Brian, Skye, Elke and Olivier have $48.

The most useful clue is the information that Skye has one quarter of the money. This means Skye has exactly $12.

Skye	Oliver	Brian	Elke
			

Next, we know that Oliver has $6 more than Skye.

Skye has $12 therefore Oliver has $18.

Skye	Oliver	Brian	Elke
			

Finally, we are told that together Brian and Skye have the same amount of money as Oliver.

Oliver has $18.

We know Skye has $12, so Brian must have $6 as $12 + $6 = $18

Skye	Oliver	Brian	Elke
			

To find how much money Elke has, we can subtract the amounts that Skye, Oliver and Brian have.

Together, they have:

$12 + $18 + $6 = $36

$48 - $36 = **$12**

Elke has **$12.**

Skye	Oliver	Brian	Elke
			

***Solution*:** The least number of tiles Bob could use is **6**.

Bob the Tiler

Bob is tiling a 6 metre × 9 metre floor.

He has three sizes of rectangular tile:

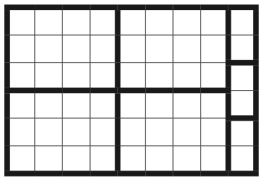
1 m × 2 m, 2 m × 3 m, and 3 m × 4 m.

No tiles may be cut.

What is the least number of tiles Bob could use to tile the floor?

Strategy: Start by covering as much of the floor as possible with 3 × 4 tiles.

We can cover **48** square metres by placing four **3 × 4** tiles in a **6 × 8** rectangle, leaving a **1 × 6** rectangle that still needs tiles.

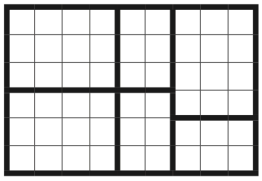


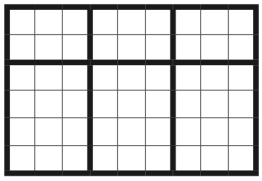
In order to cover this region we need to use three **1 × 2** tiles for a total of **7** tiles.

This configuration uses three of the smallest tiles.

There may be a better arrangement if we remove one of the **3 × 4** tiles.

If we use just three **3 × 4** tiles, the arrangements shown at the right (using just **6** tiles) become possible.





Since we cannot use four **3 × 4** tiles and have fewer than **7** tiles in total, it is not possible to have a more efficient arrangement.

Thus the answer is **6** tiles.

***Solution*:** There are **12 possible arrangements.**

Coloured Cups

There are 5 different coloured cups in a row.

The green cup is to the left of the red cup (but not necessarily next to it).

The yellow cup is to the left of the purple cup (but not necessarily next to it).

The blue cup is on one end of the row of cups.

For all 3 statements to be true, in how many different ways could these 5 cups be arranged?

Strategy: Make an Organised List.

We know that the blue cup is at the end of the row.

This means that we can arrange the other four cups, and then double that number to account for the blue cup being on one end of the row or the other.

Since the green cup is to the left of the red cup, we can have the following arrangements.

G R ☐ ☐	G ☐ R ☐	G ☐ ☐ R
	☐ G R ☐	☐ G ☐ R
		☐ ☐ G R

The unfilled locations will have yellow to the left of purple.

G R Y P	G Y R P	G Y P R
	Y G R P	Y G P R
		Y P G R

Finally, as previously noted, the blue cup can be on either end of the row.

G R Y P B	G Y R P B	G Y P R B
	Y G R P B	Y G P R B
		Y P G R B
B G R Y P	B G Y R P	B G Y P R
	B Y G R P	B Y G P R
		B Y P G R

There are **12** possible arrangements.