MATHS EXPLORER

APSMO

WEDNESDAY 7 MAY 2025

MATHS EXPLORER 1

Suggested Time: ***30 Minutes***

Write your answers in the boxes on the back.

Keep your answers hidden by folding backwards on this line.

1A. **Traffic Cones**

Tilly has been asked to put these traffic cones in a stack of 4.

How many different ways is it possible to stack the cones if the yellow cone must always be in the top?

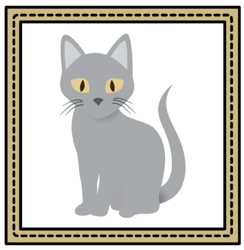
1B. **Photo Frames**

My Granny has 5 framed photos of her cats in a row on the wall.

They are hung 20cm apart.

Each of the frames is 40cm wide

How many centimetres long is the row of photos on the wall?



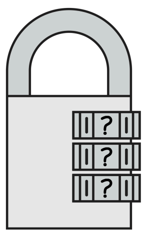
1C. **Combination Lock**

Avi has forgotten the order of the 3 digit combination for his lock.

He remembers that the combination is an even number.

He know the digits are 2, 7 and 8.

Make a list of all the even combinations for him to try.



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WEDNESDAY 7 MAY 2025

MATHS EXPLORER 1

Student Name:

1A.

1B.

1C.

Fold Here. Keep your answers hidden.

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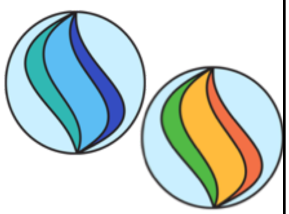
WEDNESDAY 7 MAY 2025

MATHS EXPLORER 1

Suggested Time: ***30 Minutes***

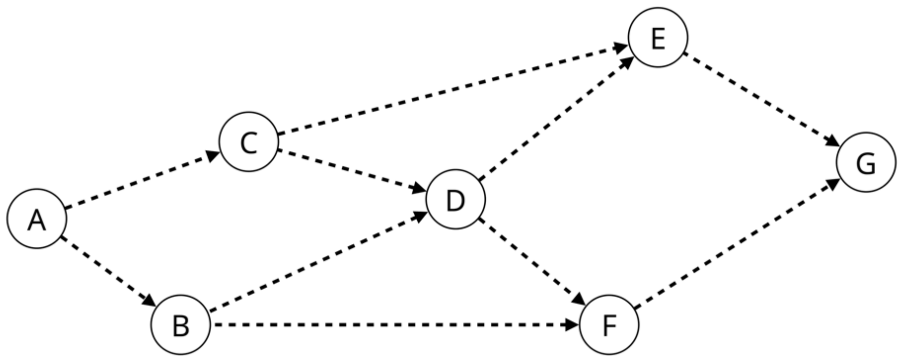
1D. **Marble Jar**

Natalie won a jar of marbles at the school fair.
She gave half of the marbles to Jackson and then she gave 7 to her sister.
She had 15 marbles left.
How many marbles did Natalie have before she gave any of them away?



1E. **Paths to Travel**

How many different ways can I travel on the lines from ***A*** to ***G*** if I am always moving towards ***G***?



Write your answers in the boxes on the back.

Keep your answers hidden by folding backwards on this line.

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WEDNESDAY 7 MAY 2025

MATHS EXPLORER 1

Student Name:

1D.

1E.

Fold Here. Keep your answers hidden.

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MATHS EXPLORER

WEDNESDAY 7 MAY 2025

MATHS EXPLORER 1

Maths Challenger #1

For distribution **if** a group have **completed** Paper 1 and there is remaining time.
These questions are **not recorded** in the Members Portal.

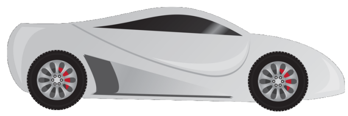
License Plate

The number on Mr. Kay's license plate has three digits.

The product of the digits is 216.

Their sum is 19.

What is the greatest three-digit number that could be on the license plate?



Write your answer in this box.

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WEDNESDAY 7 MAY 2025

MATHS EXPLORER 1

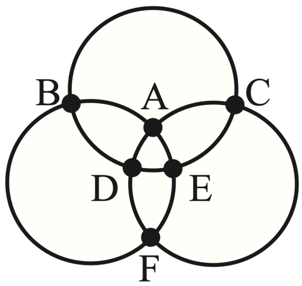
Maths Challenger #2

For distribution **if** a group have **completed** Paper 1 and there is remaining time.
These questions are **not recorded** in the Members Portal.

Streets

Three circular streets intersect at points A, B, C, D, E, and F as shown.

How many different paths can be walked along the streets from A to F, if no intersection is entered more than once when walking each path?



Write your answer in this box.

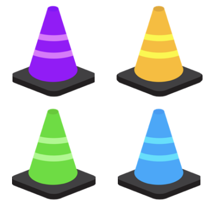
1A:	1B:	1C:	1D:	1E:
1A: 6	**1B:** 280 (cm)	**1C:** 728, 278, 872 and 782	**1D:** 44	**1E:** 6

1A. Traffic Cones

The question is:

Tilly has been asked to put these traffic cones in a stack of 4.

How many different ways is it possible to stack the cones if the yellow cone must always be in the top?



METHOD *Strategy 1*: *Draw a tree diagram.*

We can draw a tree diagram to see how many different stacks are possible.

We know there are 4 traffic cones in the stack and that the yellow cone must always be on the top.

The top cone must be yellow.

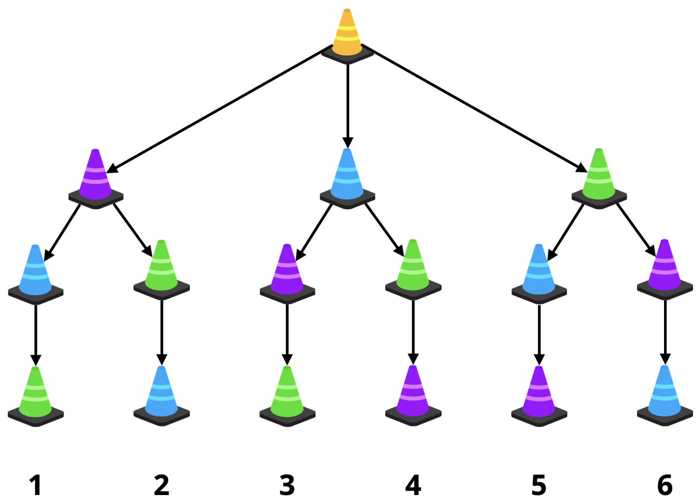
The second top cone can be purple, blue or green.

If the second top cone is purple, it can be followed by blue then green, or green then blue.

If the second top cone is blue, it can be followed by purple then green, or green then purple.

If the second top cone is green, it can be followed by blue then purple, or purple then blue.

Altogether, there are **6 different ways** that Tilly can stack the traffic cones.



METHOD *Strategy 2*: *Write an organised list.*

Y	P	B	G	1
Y	P	G	B	2
Y	B	P	G	3
Y	B	G	P	4
Y	G	B	P	5
Y	G	P	B	6

Another way to find all the different stacks possible is to write an organised list.

We know there are 4 cones in the stack and that the yellow cone must be on the top.

There are 2 ways to stack the cones if the second top cone is purple, 2 ways if the second top cone is blue and 2 ways if the second top cone is green.

There are no other possible ways to stack the cones if the yellow cone must be on top.

Altogether, Tilly can stack the traffic cones in **6 different ways**.

1B. Photo Frames

The question is:

My Granny has 5 framed photos of her cats in a row on the wall.

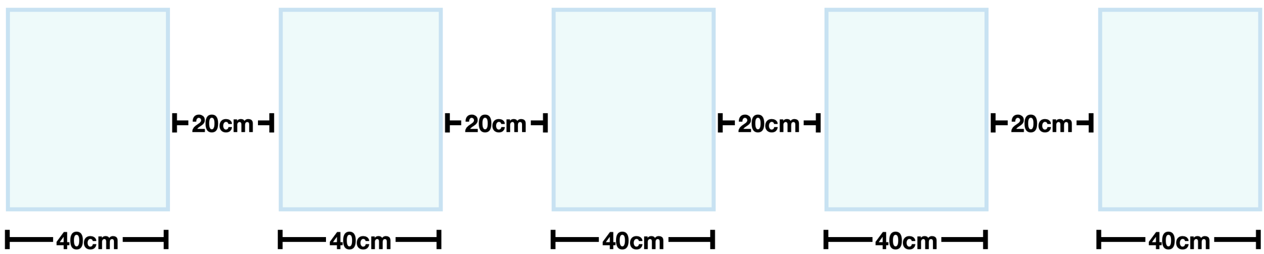
They are hung 20cm apart.

Each of the frames is 40cm wide

How many centimetres long is the row of photos on the wall?

METHOD *Strategy 1:* *Draw a diagram.*

We can draw a diagram of the 5 photo frames and the spaces between them:



40cm + 20cm + 40cm + 20cm + 40cm + 20cm + 40cm + 20cm + 40cm = **280cm**.

METHOD *Strategy 2:* *Reason logically.*

Start with the **40cm** wide photo frames.

There are **5** of them.

Together the frames are **200cm wide**.

Each frame will have a **20cm** space following it, expect for the last frame in the row.

This means there will be **4** places where there are **20cm** spaces.

Together these spaces are **80cm wide**.

We add these to find the total length of the row of photo frames on the wall:

200cm + 80cm = **280cm**.

1C. Combination Lock

The question is:

Avi has forgotten the order of the 3 digit combination for his lock.

He remembers that the combination is an even number.

He know the digits are 2, 7 and 8.

Make a list of all the even combinations for him to try.

METHOD *Strategy 1*: *Write an organised list.*

We can write an organised list to find all the possible combinations that end with an even number.

The largest even number included in the set is **8**.

There are 2 possibilities that end with **8**, 728 and 278.

The only other even number is **2**.

There are 2 possibilities that end with **2**, 872 and 782.

There are no other combinations that end with an even number.

The combinations that are even are **728, 278, 872** and **782**.

7 2 **8**

2 7 **8**

8 7 **2**

7 8 **2**

METHOD *Strategy 2*: *Draw a tree diagram.*

We can draw a tree diagram to see how many different combinations are possible and eliminate that ones that end with an odd number.

We know there are 3 digits in the combination.

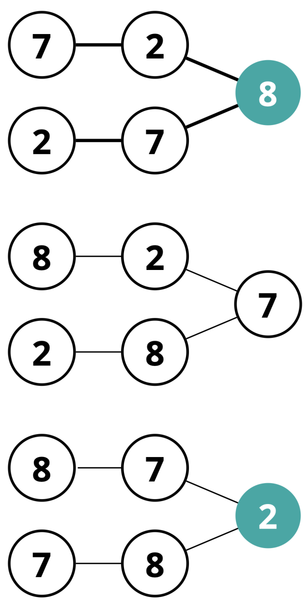
If the last digit is **8** there are 2 possible combinations, 728 and 278.

If the last digit is **7** there are 2 possible combinations, 827 and 287.

If the last digit is **2** there are 2 possible combinations, 872 and 782.

There are 6 different combinations.

Out of the 6 combinations, **4** of them end with an even number: **728, 278, 872** and **782.**



1D. Marble Jar

Natalie won a jar of marbles at the school fair.

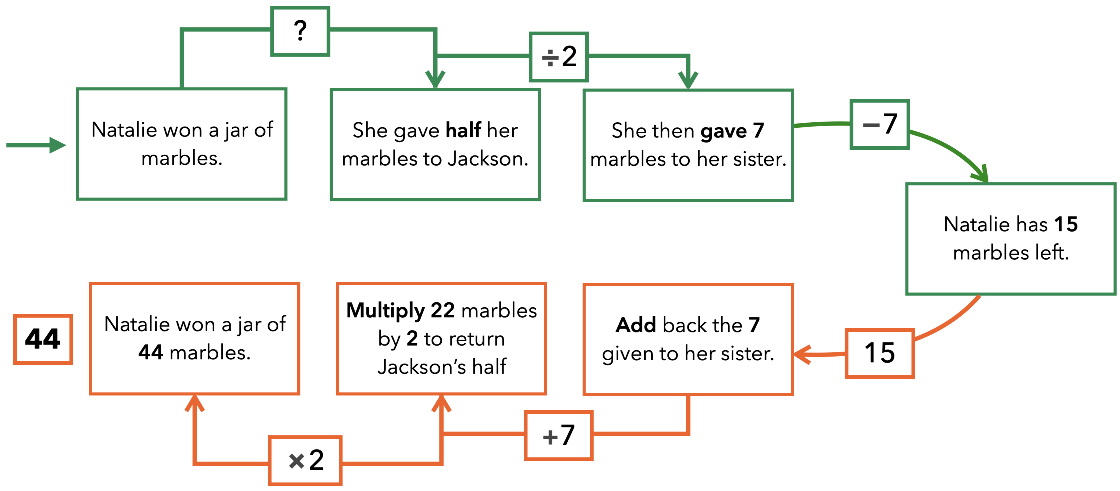
She gave half of the marbles to Jackson and then she gave 7 to her sister.

She had 15 marbles left.

How many marbles did Natalie have before she gave any of them away?

METHOD *Strategy 1:* *Work backwards.*

First let's go through the same actions as Natalie:



Let's check: Natalie won a jar of 44 marbles.

She gave half her marbles to Jackson. After that she had 44 ÷ 2 = 22 marbles.

She then gave 7 marbles to her sister. 22 − 7 = 15 marbles.

This matches the question.

Natalie won a jar of **44 marbles.**

METHOD *Strategy 2*: *Draw a diagram.*

Let's draw a bar to represent Natalie's marbles.

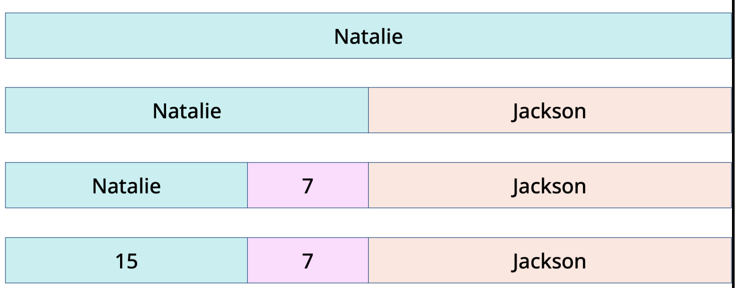
She gave half to Jackson.

She then gave 7 to her sister.

Natalie had 15 marbles left.

Before giving 7 marbles to her sister, Natalie must have had 15 + 7 = 22 marbles.

Before giving half to Jackson, Natalie must have had 22 × 2 = **44 marbles.**



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WEDNESDAY 7 MAY 2025

MATHS EXPLORER 1

1E. Paths to Travel

The question is:

How many different ways can I travel on the lines from ***A*** to ***G*** if I am always moving towards ***G***?

METHOD *Strategy 1*: *Write an organised list.*

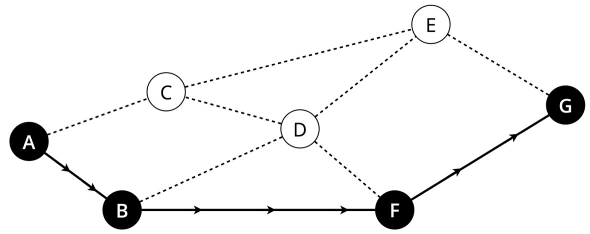
We can write an organised list to see how many different ways there are to travel from ***A*** to ***G***.

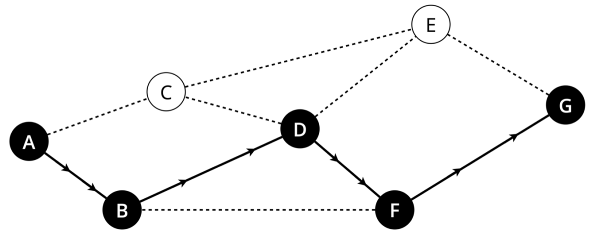
If I travel to ***B*** first, I can get to ***G*** in 3 ways:

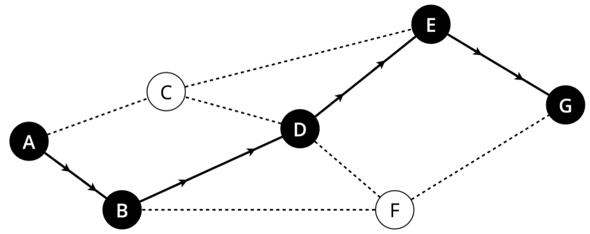
A B D E G,

A B D F G or

A B F G.





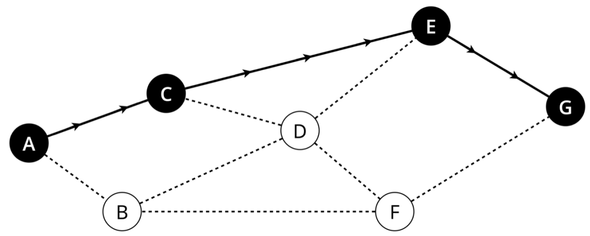


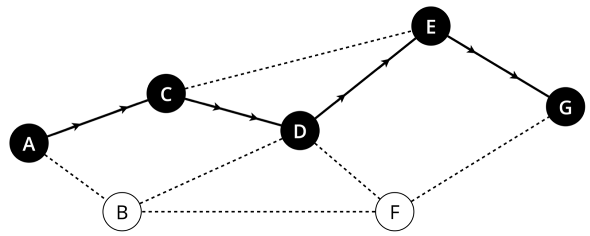
If I travel to ***C*** first, I can get to ***G*** in 3 ways:

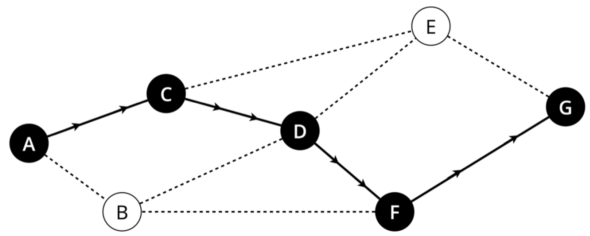
A C D E G,

A C D F G, or

A C E G.







Altogether, there are **6 ways** to travel from ***A*** to ***G.***

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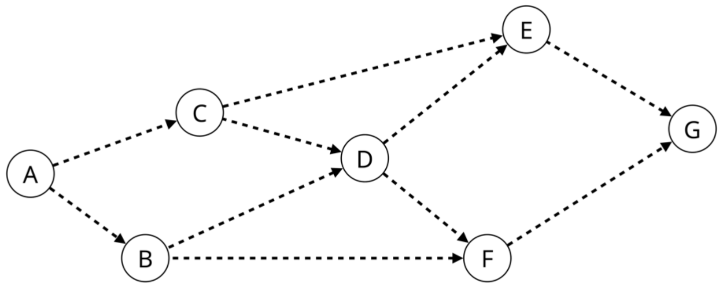
WEDNESDAY 7 MAY 2025

MATHS EXPLORER 1

1E. Paths to Travel

The question is:

How many different ways can I travel on the lines from ***A*** to ***G*** if I am always moving towards ***G***?



METHOD *Strategy 2:* *Draw a tree diagram.*

We can draw a tree diagram to see how many different paths are possible.

From ***A*** we can travel to ***B*** or ***C.***

From ***B*** we can travel to ***F*** or ***D.***

From ***F*** we can travel to ***G.***

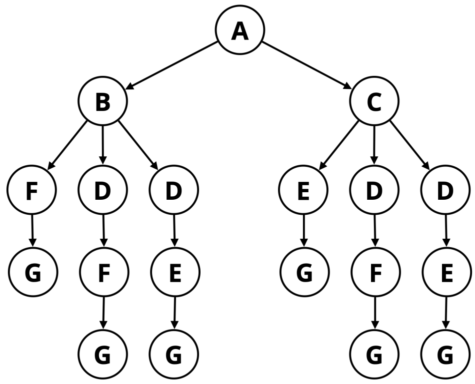
From ***D*** we can travel to ***F*** or ***E*** and then ***G.***

From ***C*** we can travel to ***E*** or ***D.***

From ***E*** we can travel to ***G.***

From ***D*** we can travel to ***F*** or ***E*** and then ***G.***

Altogether, there are **6 different ways to travel** from ***A*** to ***G.***



***Solution*:** The greatest license plate number is **964**.

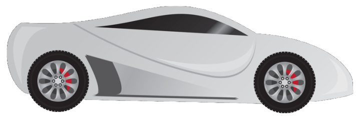
License Plate

The number on Mr. Kay's license plate has three digits.

The product of the digits is 216.

Their sum is 19.

What is the greatest three-digit number that could be on the license plate?



List all numbers whose digit-sum is 19.

List the digits in each potential plate number in descending order to make the resulting number as great as possible.

Then select the plate number whose product is 216.

Plate number	991	982	973	**964**	955	883	874	865	775	766
Product of digits	81	144	189	**216**	225	192	224	240	245	252

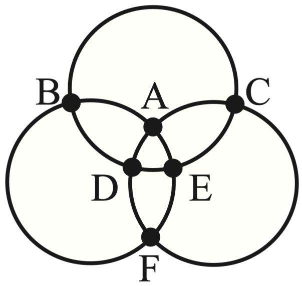
The greatest license plate number is **964**.

***Solution*:** There are **28** paths.

Streets

Three circular streets intersect at points A, B, C, D, E, and F as shown.

How many different paths can be walked along the streets from **A** to **F**, if no intersection is entered more than once when walking each path?



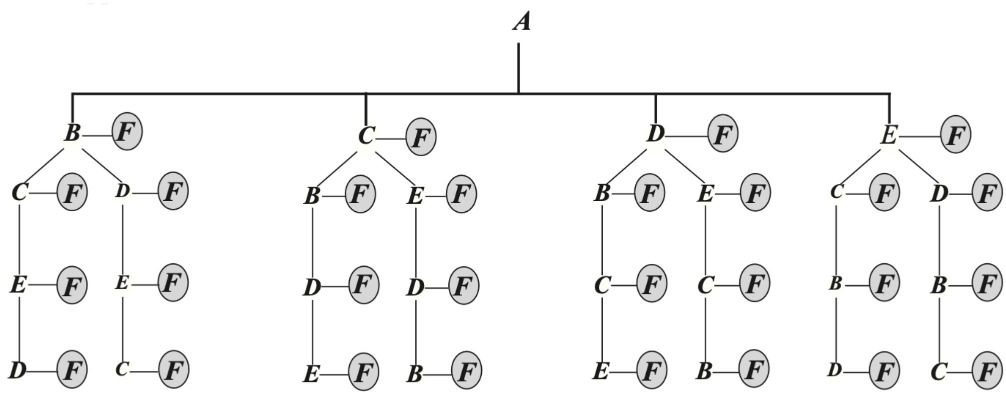
Use a Tree Diagram.

Start from A. Draw the four possible paths to B, C, D, and E.

From each draw paths to each of the three remaining points, circling F.

Then continue the tree diagram, circling F each time it appears.

Use the diagram to confirm each path. Count the number of times that F appears.



Letter F appears 28 times, therefore there are **28 paths**.