Maths Week Scotland

This mini-competition is inspired by the annual 'Mathématiques sans Frontières' contest. 'Maths wi nae Borders' can be entered by *any* class in Scotland. The five tasks should be completed in less than two hours ideally but given the current school situation due to COVIDI9 flexibility is permitted. Entries must be received by 31st October 2020. Information on how to submit your entry is on the last page.

Some advice from the markers, based on previous competitions:

-Partial solutions and attempts can gain marks.
-Neat and careful work is important (especially since your work will be photographed for submitting this year)
-Remember that we are looking for entries from an entire class (so as a class pick your best solution to each of the five problems).
-Many entries will include correct answers so consider how to make your entry stand out (an excellent answer might include a description of how you approached the question, any extra formulae or strategies you came across or any observations that you think are Mathematically interesting).

All participating teams will receive a certificate. The winning team will receive a trophy and there will be prizes for their individual team members!

Insert numbers in the boxes to make every sentence on the poster correct!

The number 1 appears ☐ time(s) on this poster.

The number 2 appears ☐ time(s) on this poster.

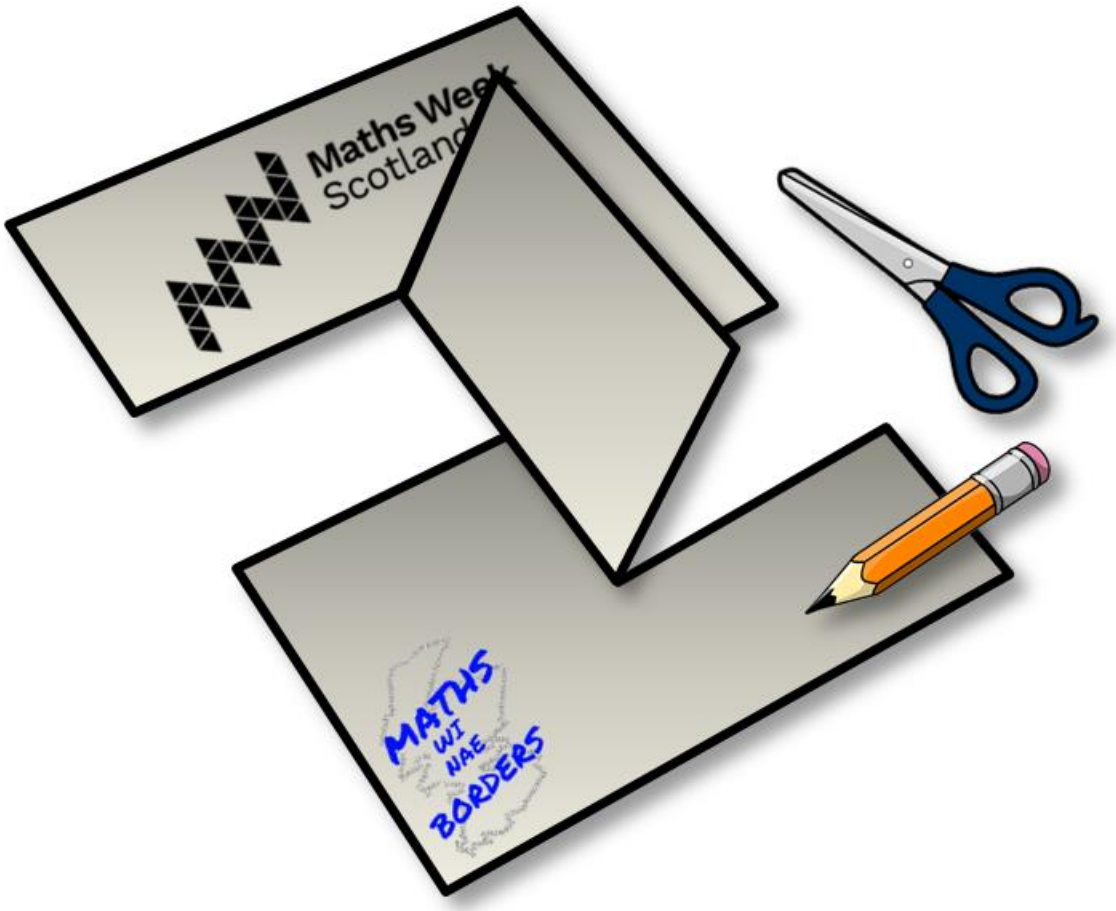
The number 3 appears ☐ time(s) on this poster.

The number 4 appears ☐ time(s) on this poster.

The number 5 appears ☐ time(s) on this poster.

At the Maths Week Scotland headquarters, a single sheet of paper is found- it has been folded and cut in a weird way.

The piece of paper now looks like this:



Your task is to take a single sheet of paper, cutting and folding it to replicate what you see above...Be careful to keep your paper in one piece!

(Make sure when submitting your answer that your photos or videos or diagrams show clearly the cuts on your sheet of paper before folding and the finished masterpiece when folded)

3

The Calculator Club's first ever meetin' wis during Maths Week Scotland twa thousand an nineteen. Invites went oot tae aw the members: "Yer welcome tae attend Calculator Club. Ye've got tae bring at least wan antique calculator and wan new-fangled calculator wi' ye, but so there's nae showin' aff, everywan hus tae bring the same number o' calculators."

Oan the big day, there were atween twa hunner and three hunner calculators at the club. If ye kent the exact number o' calculators ye'd be able to figure oot how mony club members there ur. So, how mony members are in the club? And how mony calculators huv they got wi' them? Explain yer answer.

Calculator club

Club Àireamhair

Give your answer to this question in Gaelic or Scots using a minimum of 30 words.

Ghabh a' chiad choinneamh de Chluba an Àireamhair àite tro Sheachdain Matamataigs na h-Alba 2019. Chaidh cuireadh a thoirt gu gach ball: "Tha fàilte romhaibh a thighinn gu Cluba an Àireamhair. Feumaidh tu co-dhiù aon seann àireamhair a thoirt leat agus aon àireamhair ùr cuideachd, ach gus stad a chur air daoine a bhith ri bòstadh, feumaidh a h-uile duine an aon àireamh de dh'àireamhairean a thoirt leotha."

Air an latha mòr bha eadar 200 agus 300 àireamhairean aig a' chluba. Nam biodh fios agad air an àireamh de dh'àireamhairean a bh' ann, dh'fhaodadh tu dèanamh a-mach cia mheud ball a th' aig a' chluba. Mar sin, cia mheud ball a th' anns a' chluba? Agus cia mheud àireamhair a thug iad leotha?

Maths Week Scotland

Harris is really annoyed because he has forgotten the combination of his padlock. It has 3 dials each with 12 numbered positions.

To open the lock Harris decides to try each possibility in a systematic way :

0-0-0, 0-0-1, 0-0-2, ... , 0-0-11

0-1-0, 0-1-1, ... , 0-1-11

0-2-0, ... etc.

Every attempt takes one second. After 16 minutes 45 seconds the padlock finally opens !

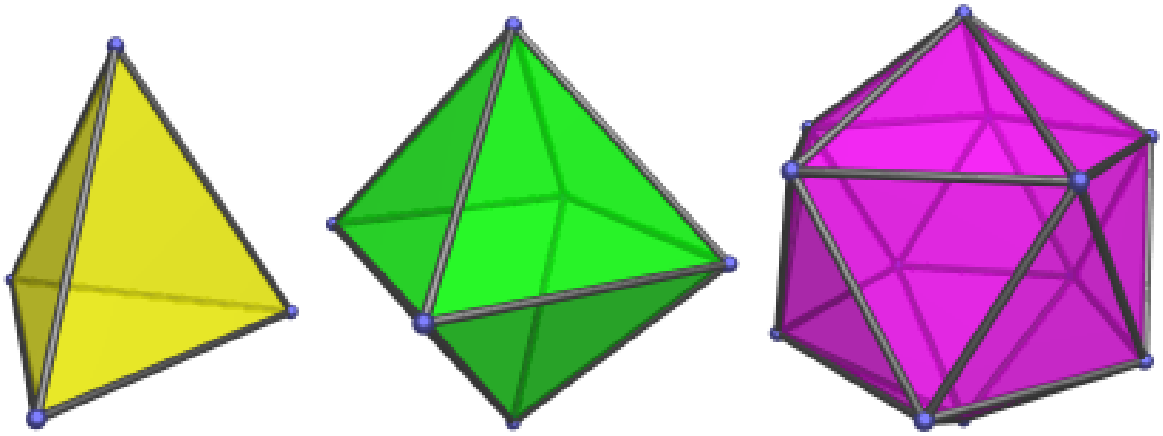
What is the combination of the padlock ? Explain your answer!

⑤

The following shapes are regular polyhedra made using silver rods and blue connectors.

The blue connectors are all the same size and weight- so are all the silver rods.

The model of the tetrahedron has a mass of 76g and the octahedron has a mass of 132g.



What is the mass of the model of the icosahedron? Explain your answer!

Note: the coloured faces are just to make the images clearer, they weigh nothing!

Maths wi nae borders

Maths Week Scotland

2020 SUBMISSION GUIDELINES

Due to COVID19 restrictions, we can only accept entries electronically this year. Creative submissions are still encouraged but these will have to be carefully captured as photos or videos and uploaded using the following guidelines...

1. **Complete the online form to register your team at https://www.mathsweek.scot/schools/maths-week-challenges**

2. **Complete as many questions as you can. Capture each solution and clearly label its file with a name indicating the QUESTION NUMBER.**

3. **Include a file (word document, excel file or photo of the form below which clearly identifies the School, Contact Teacher, Class Name, email address and number of pupils participating for certificate purposes)**

4. **Stick all of these files in a folder with a name indicating your SCHOOL, TEACHER, CLASS.**

5. **Upload your folder to https://wetransfer.com/ and send it to mathsweekscot@nms.ac.uk (you will be notified when we download this, confirming your entry has been received).**

Please attach one of these completed information sheets with every class who have submitted an entry.

Maths wi nae borders

School:

Contact Teacher:

Email Address:

Class Name:

Number of pupils in class (for certificate purposes):

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