7-9: REMOTE MATHS
EDITION 9

ALGEBRA LAWS AND THE CARTESIAN AXES

Mathematical language: Brackets, distributive, integers, algebraic rule, cartesian axes, coordinates,

TASK 1: BRACKETS MATTER

By placing just one pair of brackets, find as many different solutions to this problem as you can

$3 + 4 \times 8 - 6 \div 2$

- Write each question, and answer, as an equation.
- Find all six possibilities?

Add two pairs of brackets to make as many different answers to these calculations as you can.

- $4 + 5 \times 8 - 6 \div 2 + 3$
- $14 \times 5 + 12 \times 3 - 40 \div 4$
- What are the smallest answers you can make? What are the largest answers you can make?

TASK 2: FOUR PILES PROBLEM *Source Maths 300*

Place 20 blocks into 4 piles so that:

- The first pile has three more than the third pile.
- The third pile has one more than pile two.
- Pile four has twice as many as pile two.

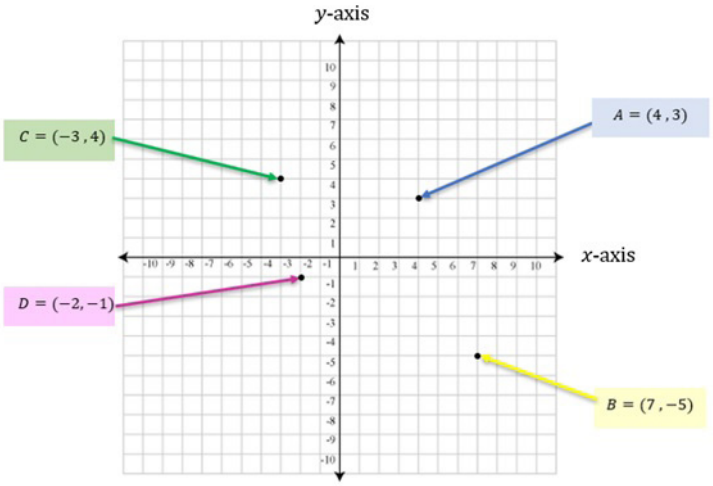
This same set of clues works for 25, 30, 35 blocks. Complete this table.

Possible totals	Solution: Number of blocks in each pile			
	Pile 1	Pile 2	Pile 3	Pile 4
20				
25				
30				
35				

- What do you notice?
- What would the solution look like for 50 blocks?
- What if there were 0 blocks in Pile 2?
- Create an algebraic rule to represent this information.

TASK 3: CARTESIAN AXES

Just as we can extend a number line to include negative numbers, we can also extend our Cartesian axes to form 4 quadrants. The Cartesian axes can be used to locate coordinates. Coordinates are given as ordered pairs with the horizontal coordinate (x) being given first and the vertical coordinate (y) second: (x, y)



Mark on the number line E: (-4,3) and F: (-3,0)

On a sheet of graph paper draw a set of Cartesian axes, extending from -10 to +10, along both axes.

Draw a line joining: (10,0) to (0,1); (9,0) to (0,2); (8,0) to (0,3); (7,0) to (0,4); (6,0) to (0,5); (5,0) to (0,6); (4,0) to (0,7); (3,0) to (0,8); (2,0) to (0,9); (1,0) to (0,10).

Draw a line joining: (-10,0) to (0,1); (-9,0) to (0,2); (-8,0) to (0,3); (-7,0) to (0,4); (-6,0) to (0,5); (-5,0) to (0,6); (-4,0) to (0,7); (-3,0) to (0,8); (-2,0) to (0,9); (-1,0) to (0,10).

Draw a line joining: (-10,0) to (0, -1); (-9,0) to (0, -2); (-8,0) to (0, -3); (-7,0) to (0, -4); (-6,0) to (0, -5); (-5,0) to (0, -6); (-4,0) to (0, -7); (-3,0) to (0, -8); (-2,0) to (0, -9); (-1,0) to (0, -10).

Draw a line joining: (10,0) to (0, -1); (9,0) to (0, -2); (8,0) to (0, -3); (7,0) to (0, -4); (6,0) to (0, -5); (5,0) to (0, -6); (4,0) to (0, -7); (3,0) to (0, -8); (2,0) to (0, -9); (1,0) to (0, -10).

- What do you notice?
- Design and draw your own piece of Maths Art, using the cartesian axes. Make sure you list the coordinates of all the points you have used.

Enabling prompt: Begin with one or two quadrants rather than all 4.

Extending prompt: Using either the design above or your own piece of Maths art, display this by using either:

- A square piece of coloured cardboard (black works well) and coloured string. Join the coordinates by threading your string through a needle. OR
- A square piece of timber, some nails and strong coloured thread

TRANSFORMATION AND CONGRUENCE

Mathematical language: Flip, slide, turn, translate, half, horizontal, diagonal, symmetry, reflective, rotational, rotate, transform, mirror, angle.

TASK 1: FOOTPRINTS *Adapted from ReSolve: Maths by Inquiry*

Footprints can make some great transformation image known as a frieze pattern. Here are two examples

- How do you think these footprints were made?
- What forms of symmetry can you find in each footprint pattern?
- Try and use as many relevant words from this list to describe each footprint: Translate, glide, reflection, rotation, horizontal, vertical, turn, mirror, congruent.

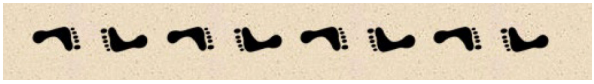
Supporting task: Using some water and an outdoor space, crate and document your own footprints and describe the tessellation.

Extending prompt: Recreate these footprints, and 3 footprints of your own on grid paper.

1 

2 

3 

4 

TASK 2: TESSELLATING PATTERNS

Watch this TedEd talk about symmetry and complex patterns https://ed.ted.com/lessons/the-complex-geometry-of-islamic-design-eric-broug#watch

- Using a compass and ruler create your own 4, 5 or 6 point pattern.
- Describe your pattern using geometric language.

TASK 3: ESCHER

Mathematician and artist M.C. Escher utilised tessellation in his work. Take a look at Sky and Water I. In this example, birds and fish have been manipulated to tesselate together seamlessly.

Using a triangle as a base, cut bits off one side and place them on the other to create your own tessellation.

Enabling prompt: For some tessellation help, try this https://www.youtube.com/watch?v=7GiKeeWSf4s

Supporting task: Investigate M. C. Escher's work and create a list of his works that tesselate, along with the base shape of each of the tessellations.

EDITION 9: TRANSFORMATION (CONT.)

TASK 4: CONGRUENT TRIANGLE

Watch Eddie Woo and his class review the conditions for congruence of triangles. https://www.youtube.com/watch?v=7ynkddMyV94

- Create a PowerPoint outlining each of the conditions
- Provide examples and non-examples

Extending prompt: Build your PowerPoint to include conditions for quadrilaterals https://www.youtube.com/watch?time_continue=85&v=9KCNY2OYDTU.

MAV would love your feedback on these resources. Click on the link or scan the QR code.

https://www.surveymonkey.com/r/MAHhomelearning

TASK 5: TESSELLATION AND TRANSFORMATION HUNT

Head into your garden, or a neighbourhood park.

- Take photos or draw picture of the things that you find that either show symmetry or rotational transformation.
- Describe the images you found.

MATHS APP OF THE WEEK: PATTERN SHAPES

Students use Pattern Shapes to explore geometry and fractions, create their own designs, or filling in outlines. As they work with shapes, students think about angles, investigate symmetry, and compose and decompose larger shapes.

https://apps.mathlearningcenter.org/pattern-shapes/

Look out for more tasks next week!