Weekly Challenge #12 Answers

Welcome to the Count on Us Secondary Challenge's twelfth weekly challenge.

1. Standard carpet tiles are 50cm squares. How many tiles would be needed to cover the whole of a room 4.5m x 6m? $9 \times 12 = 108$

2. The internal dimensions of a packing box are 15cmx18cmx26cm. How many smaller boxes 5cmx2cmx13cm would fit inside? $3 \times 9 \times 2 = 54$

3. A standard tin of baked beans is 110mm high and has diameter 73mm. A pack of 24 are put in a packing box in 4 layers of 2x3. What are the internal dimensions of the packing box?
$146mm \times 219mm \times 220mm$

4. A Count on Us Challenge Floor Hex mat is made of 16 hexagonal tiles. Each hexagon has side length 40cm. What is the size of the smallest rectangle the completed 4x4 board would fit inside?

   Width = width of 6.5 hexagons = $69.3 \times 6.5 = 450.3cm$. Each hexagon is twice the height of the equilateral triangle. Using Pythagoras each one is $\sqrt{40^2 - 20^2} = 69.3cm. \, Height =$
   $6.5 \times 40 = 260cm.$
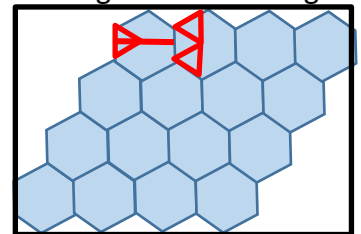
5. A shipper needs to send boxed Pop! Vinyl figures. They are packed in standard shipping boxes 40cmx40cmx40cm. The figures are in boxes 11.5cmx16cmx9cm. What is the largest number they can fit in one shipping box? If they are all the same way round then $3 \times 2 \times 4 = 24$ Did you find a better way?

6. Twenty baked bean tins could be placed in a layer in two different ways:
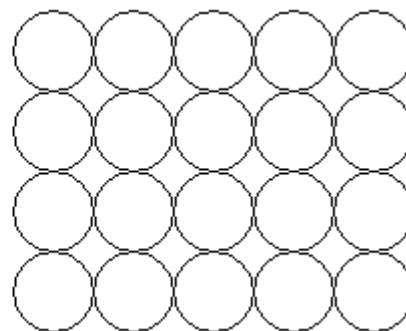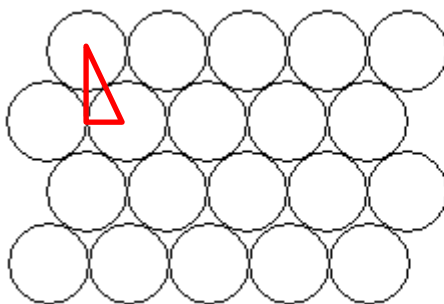
   What size rectangle will each of these fit in? (Remember: diameter 73mm) (i) Width $5.5 \times 73 = 401.5$ Height is 3 triangles as above plus a circle! By Pythagoras the triangle height is $\sqrt{73^2 - 36.5^2} = 62.6$. So, height = $62.6 \times 3 + 73 = 260mm$. (look here https://nrich.maths.org/604/solution) (ii) $365mm \times 292mm$

7. A typical school classroom is approximately 6m by 9m. Draw a plan to show how you would get the largest number of students plus their teacher into this classroom while observing physical distancing guidelines while sat for the lesson. Share them with your school!