

## Measures and 3-D (Junior UKMT)

These questions must be attempted without a calculator

Topics covered in the questions below may not necessarily be from the topic of the title.

1. Four lamp posts are in a straight line. The distance from each post to the next is 25m.

What is the distance from the first post to the last?

A 25m            B 50m            C 75m            D 100m            E 425m

2. Each day throughout July 1995 I picked 300g of raspberries from my garden.

What was the total weight of the raspberries I picked that month?

A 10g            B 9kg            C 9.3kg            D 10kg            E 9300kg

3. Each face of a cube is to be painted. Six different colours of paint are available.

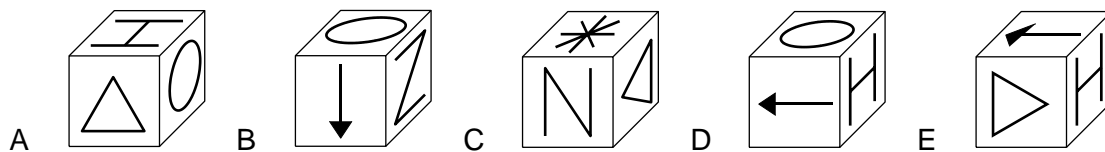
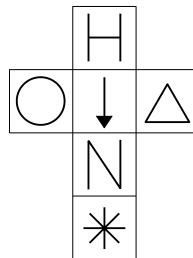
What is the smallest number of colours one must use if "adjacent" faces (those having an edge in common) never have the same colour?

A 2            B 3            C 4            D 5            E 6

4. Roughly how much is 200ml?

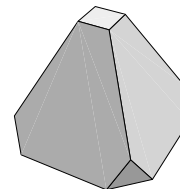
A a thimbleful    B a spoonful    C a cupful    D a saucepanful    E a bucketful

5. Which of the cubes below could have been made by folding the net shown?



6. A solid square-based pyramid has all of its corners cut off, as shown.

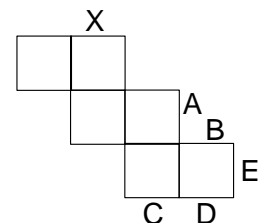
How many edges does the resulting shape have?



A 8            B 13            C 15            D 20            E 24

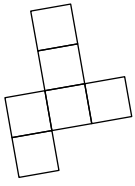
7. The diagram shows the net of a cube.

Which edge meets the edge X when the net is folded to form the cube?

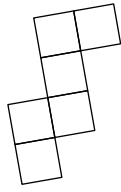


A            B            C            D            E

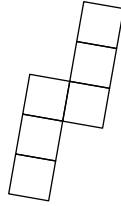
8. How many of the following nets could be folded to make a cube?



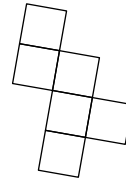
A 1



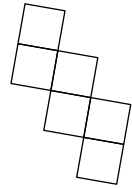
B 2



C 3



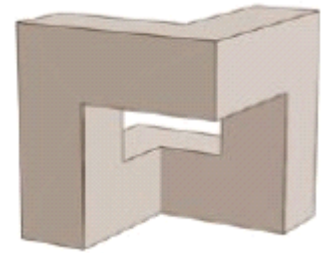
D 4



E 5

9. The sculpture 'Cubo Vazado' [Emptied Cube] by the Brazilian artist Franz Weissmann is formed by removing cubical blocks from a solid cube to leave the symmetrical shape shown.

If all the edges have length 1, 2 or 3, what is the volume of the sculpture?



A 9

B 11

C 12

D 14

E 18

10. Sally has 72 small wooden cubes, each measuring 1 cm  $\times$  1 cm  $\times$  1 cm. She arranges them all so that they form a cuboid.

Given that the perimeter of the base of the cuboid is 16 cm, what is its height?

A 4 cm

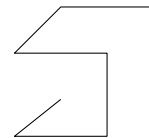
B 6 cm

C 8 cm

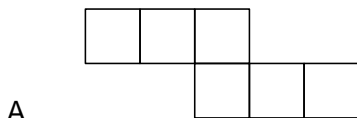
D 9 cm

E 12 cm

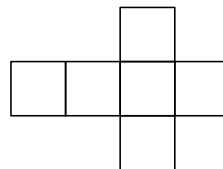
11. A cardboard cube is cut along its edges by a cut following the line shown in the diagram. The cube is then opened out and placed flat on a table.



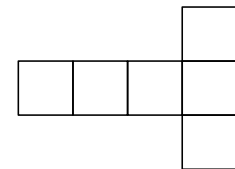
Which of the following could be the resulting shape?



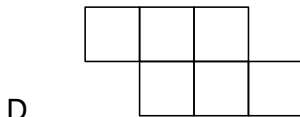
A



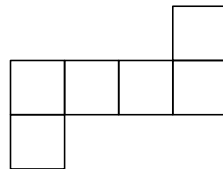
B



C



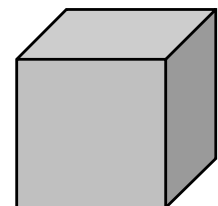
D



E

12. The diagram shows a unit cube coloured blue. Additional blue unit cubes are glued face-to-face to each of its six faces to form a three-dimensional "cross".

If unit cubes coloured yellow are now glued face-to-face to all the spare faces of this cross, how many yellow unit cubes are required?



A 6

B 18

C 24

D 30

E 36