

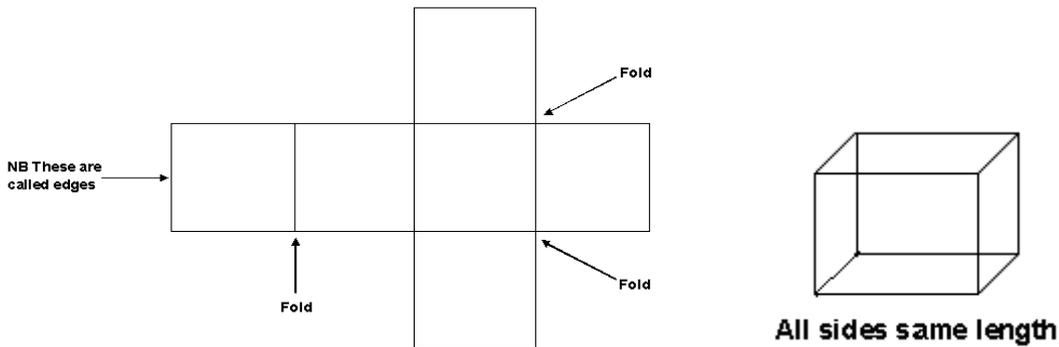
NETS AND TESSELLATIONS

NETS

Many goods nowadays sold in packets or boxes e.g. chocolates are sold in cardboard boxes. These boxes which hold the goods have to be made i.e. a pattern is needed for the cardboard. This pattern is called a "net".

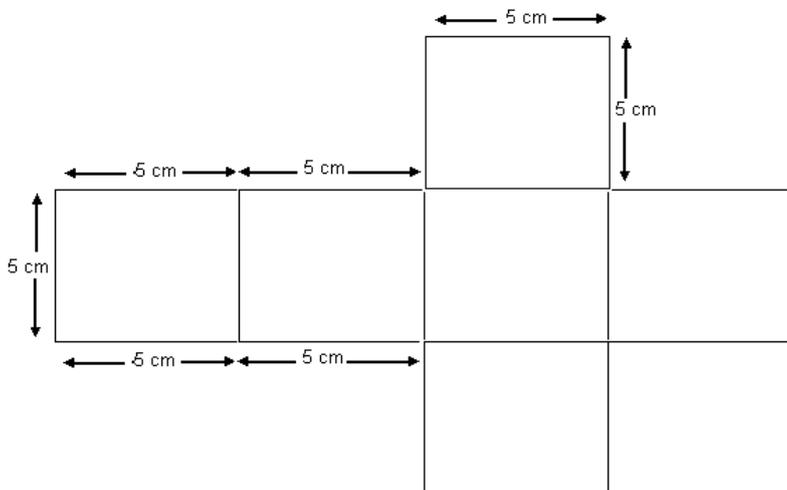
Example 1

Net of a cube

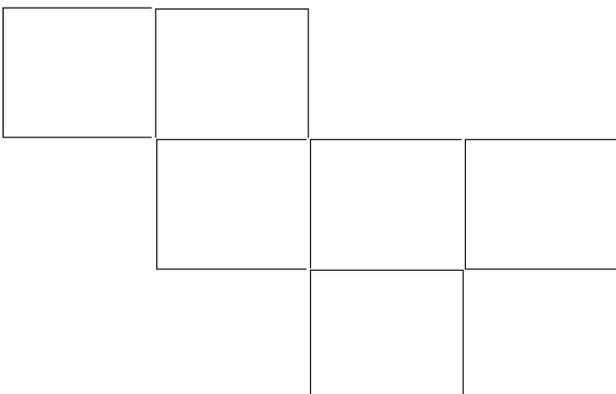


If we fold along the edges we will have a cube.

The appropriate measurements have then to be put on the diagram e.g. if a cube of side 5 cm is required the diagram would be:



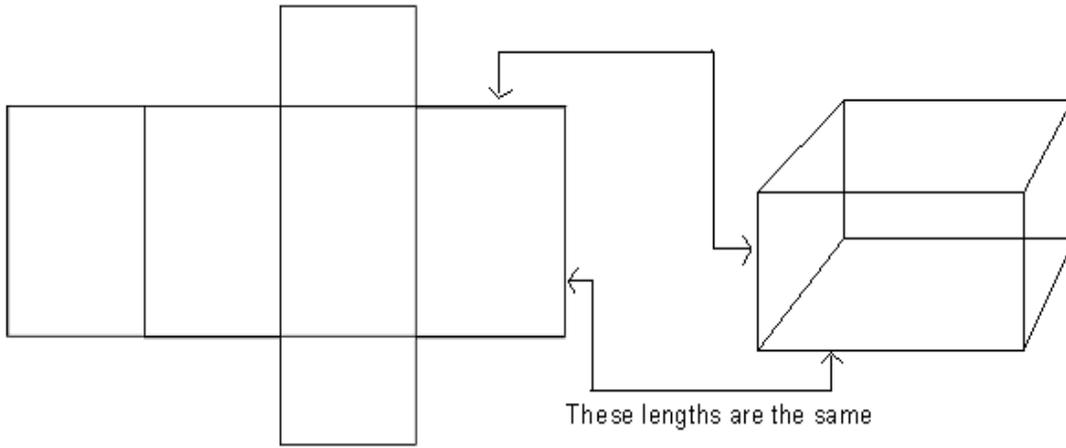
NB Sometimes it is possible to have more than one net for a particular solid.



This net also gives a cube.

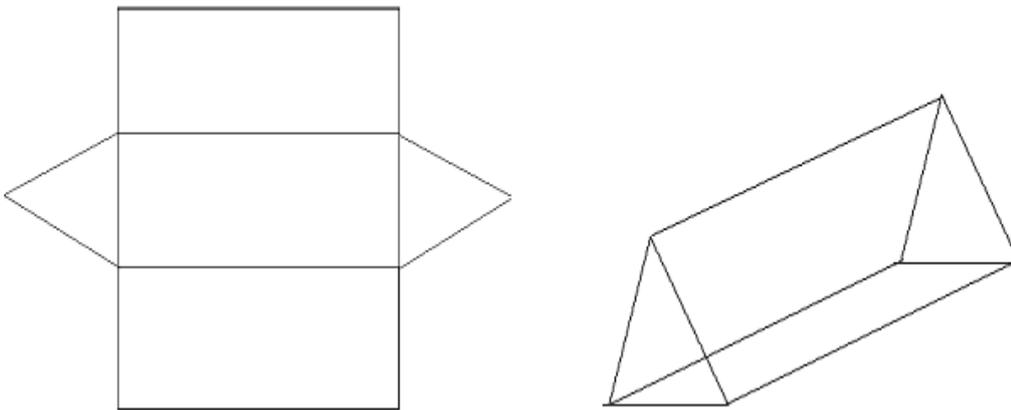
Example 2

Net of a cuboid.



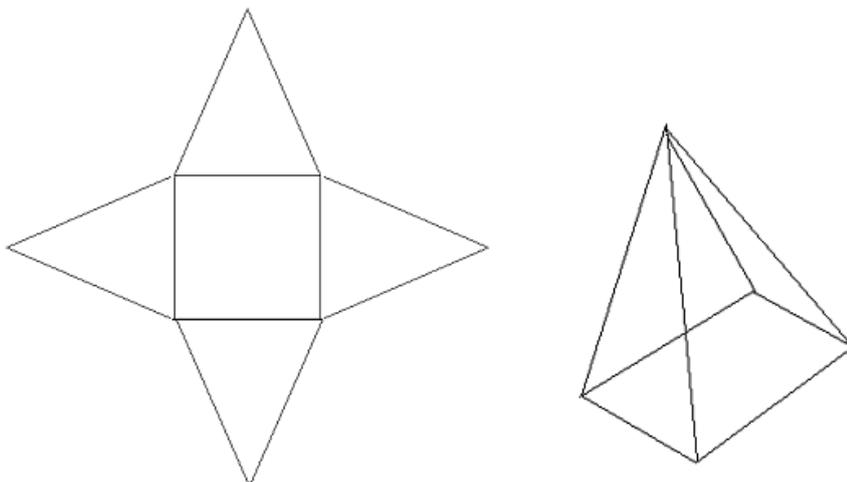
Example 3

Net of a triangular prism.



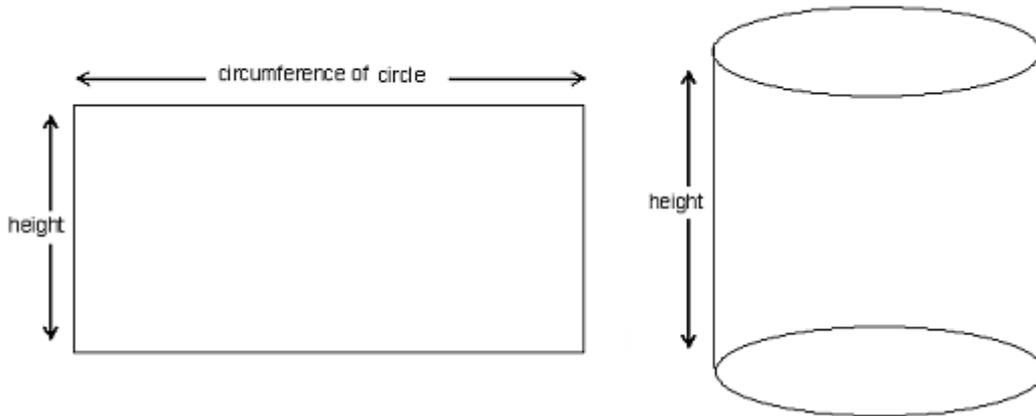
Example 4

Net of a pyramid with a square base.



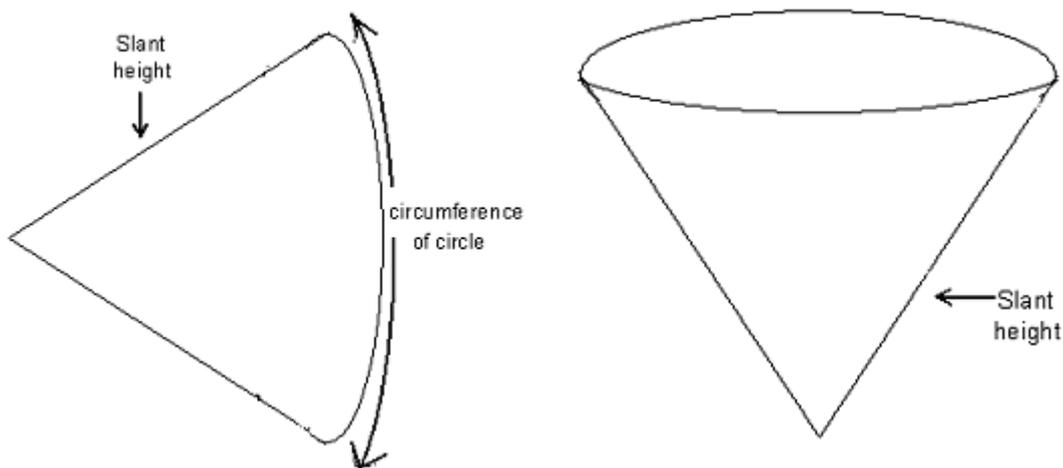
Example 5

Net of a cylinder without a top and bottom.



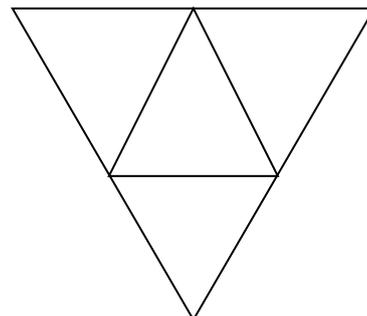
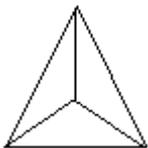
Example 6

Net of a cone.



Example 7

Net of tetrahedron



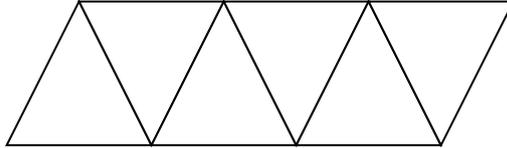
Try drawing some nets and making up the appropriate solid.

TESSELLATIONS

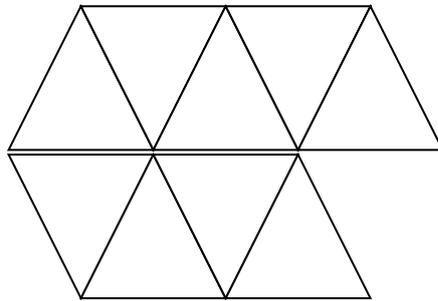
Tessellations are patterns formed by congruent shapes (i.e. shapes which are exactly alike) which can fit together without any gaps to cover an area.

There are many different tessellations using triangles

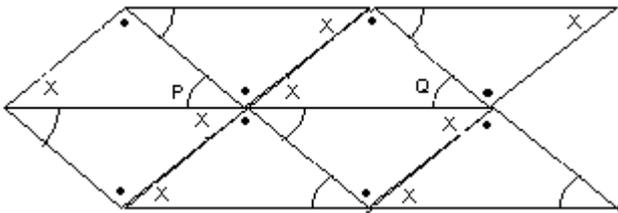
1. Equilateral triangles.



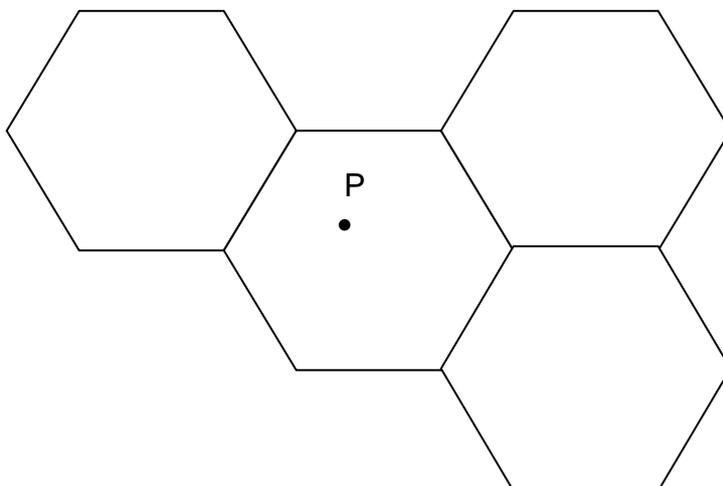
2. Isosceles triangles will also tessellate easily.



3. In fact any triangle can be used.



Notice how the sum of the triangles around points like P is 360° .
Regular hexagons will tessellate.

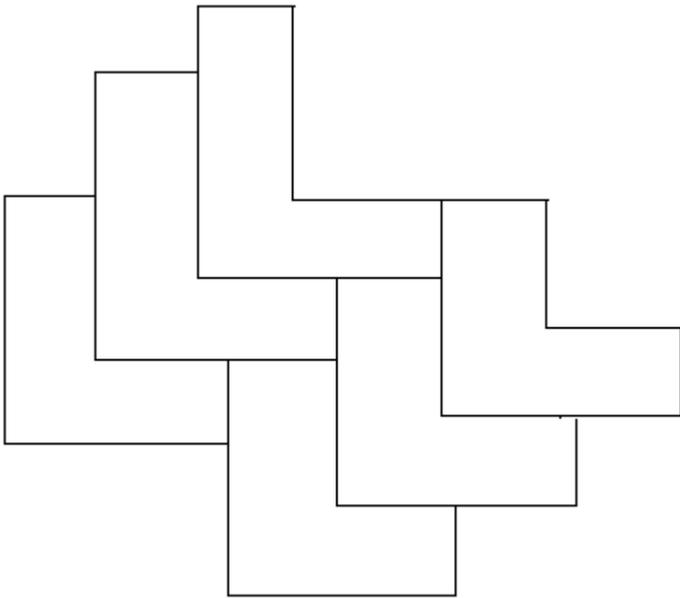


N.B. regular polygons will tessellate if their interior angle will divide exactly 360° .

The interior angle of a regular hexagon is 120° .

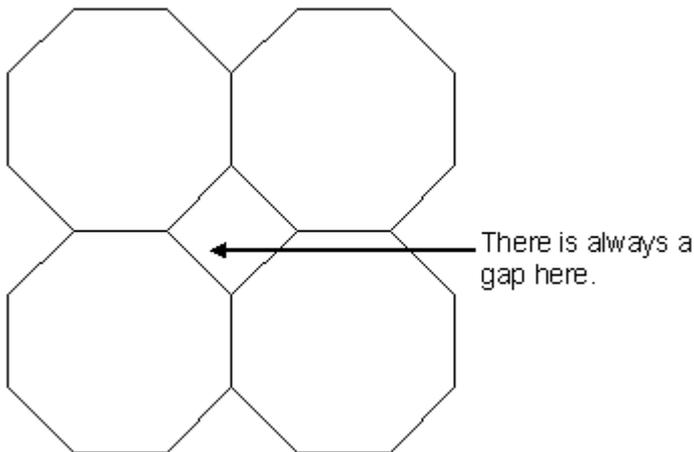
$$\frac{360}{120} = 3$$

Therefore regular hexagon will tessellate.
Some letter shapes will tessellate, e.g.,

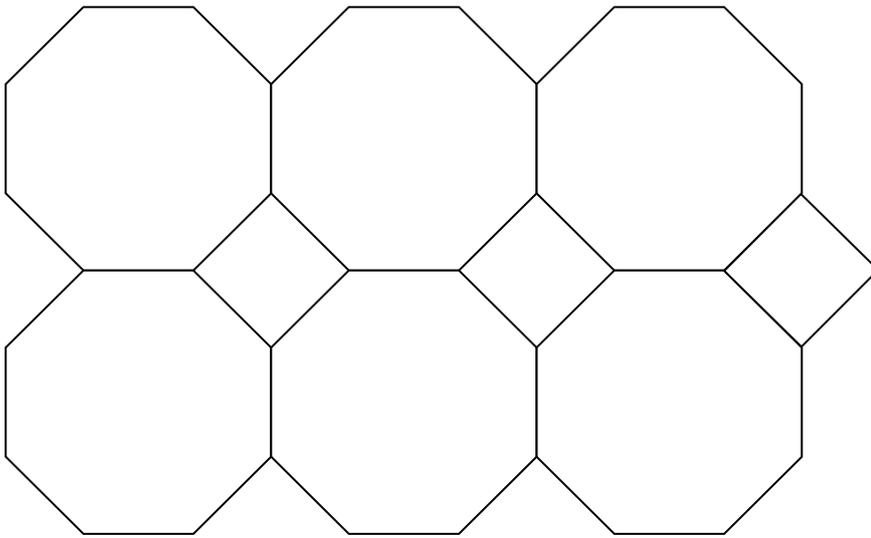


BUT

Regular octagons will not tessellate. (The interior angle of a regular octagon is 135°)



However, tessellations can often be made by combing different shapes. If you look at the example above, it is made up of squares **and** regular octagons. So we say that a combination of regular octagons and squares tessellate.

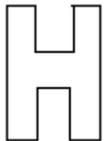


Many of these patterns are used everyday – on wallpapers and on tiled floors.

Exercise 1

State whether or not the following shapes will tessellate. If they do, draw the pattern.

1. Rectangles
2. Circles
3. Rhombus
4. Pentagons
5. Isosceles triangle and regular octagons
- 6.



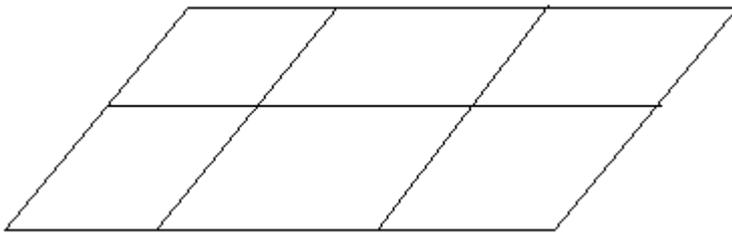
ANSWERS

1. Yes



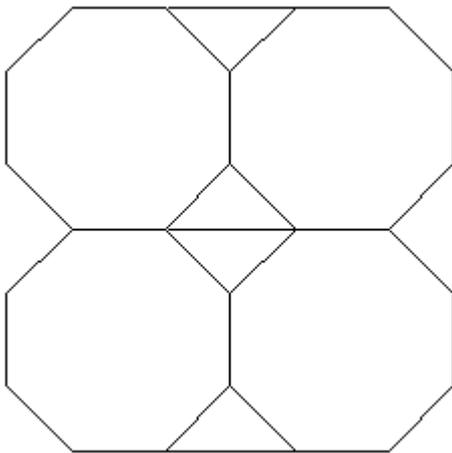
2. No

3. Yes



4. No

5. Yes



6. Yes

