

NAME: _____

DIV: _____

DATE: _____

8.3

Tessellations

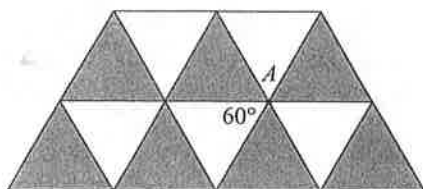
A tessellation is a pattern made of repeated shapes that covers a surface completely without overlapping or leaving any gaps. Historians have found tessellations as old as 4000 BC. The Greeks, Romans, and Moors decorated their homes with tiles that were tessellations.

Regular Polygons

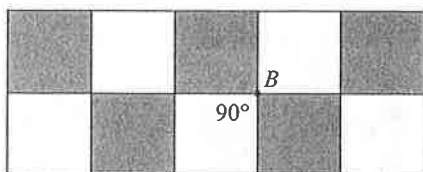
A regular polygon is a closed figure that has all sides and angles equal. A regular tessellation is made up of equal regular polygons.

Only three regular polygons tessellate: triangles, squares, and hexagons. This is because the sum of the angles at any point where the regular polygons meet is 360° .

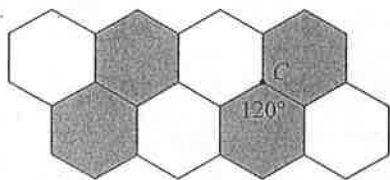
Triangles

Tessellates at $\angle A = 60^\circ \rightarrow 6 \times 60^\circ = 360^\circ$

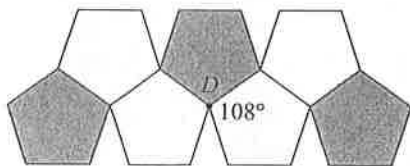
Squares

Tessellates at $\angle B = 90^\circ \rightarrow 4 \times 90^\circ = 360^\circ$

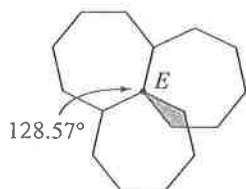
Hexagons

Tessellates at $\angle C = 120^\circ \rightarrow 3 \times 120^\circ = 360^\circ$

Pentagons

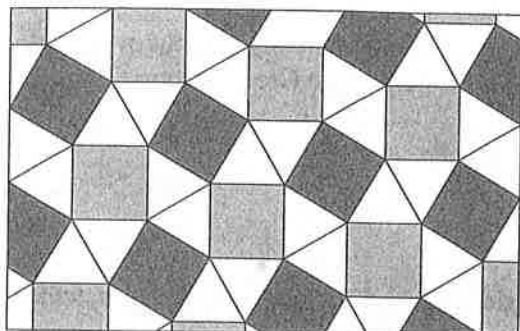
Does not tessellate at $\angle D = 108^\circ \rightarrow 3 \times 108^\circ = 324^\circ$
(There is a gap of 36° at $\angle D$)

Heptagons

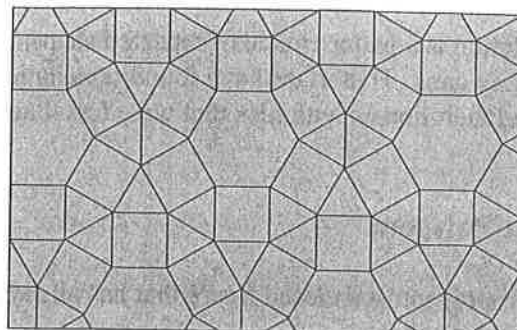
Does not tessellate at $\angle E = 128.57^\circ \rightarrow 3 \times 128.57^\circ = 385.71^\circ$
(There is an overlap of 25.71° at $\angle E$)

Combining Polygons

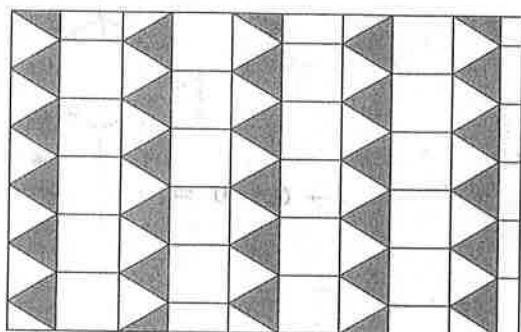
Tessellations can be made by combining polygons of more than one shape.



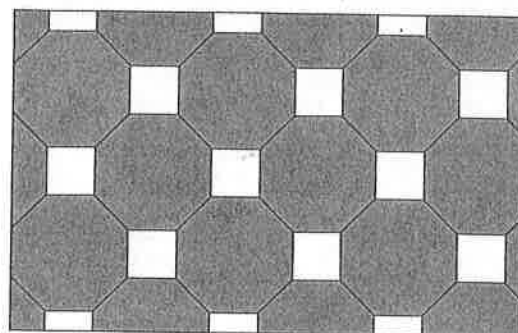
Squares and Triangles



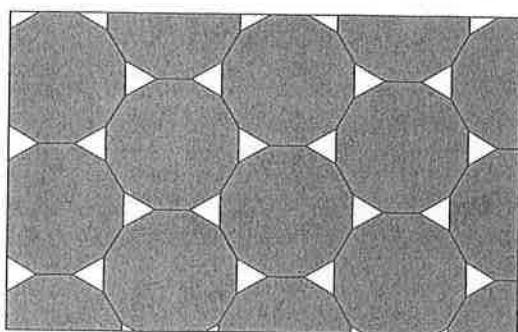
Hexagons, Triangles, and Squares



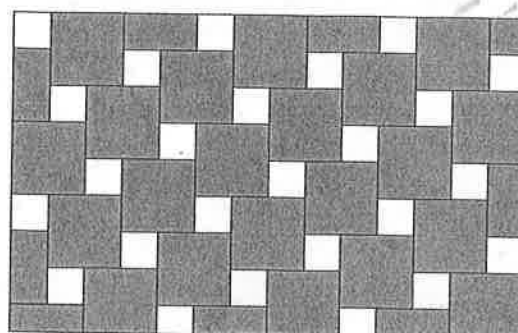
Triangles and Squares



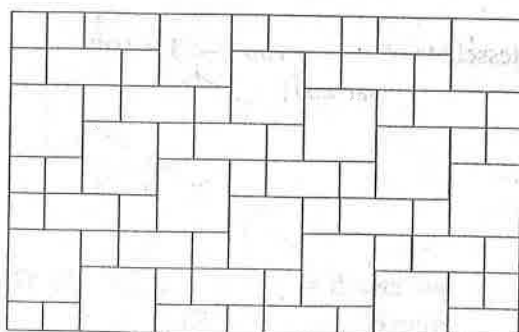
Octagons and Squares



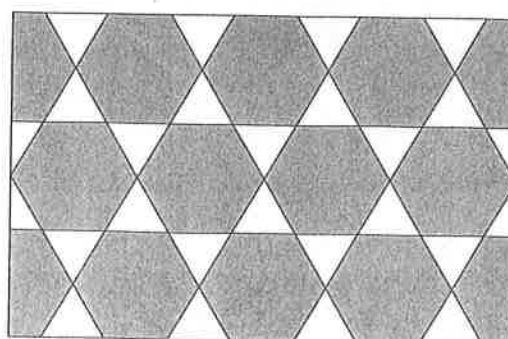
Dodecagons and Triangles



Squares



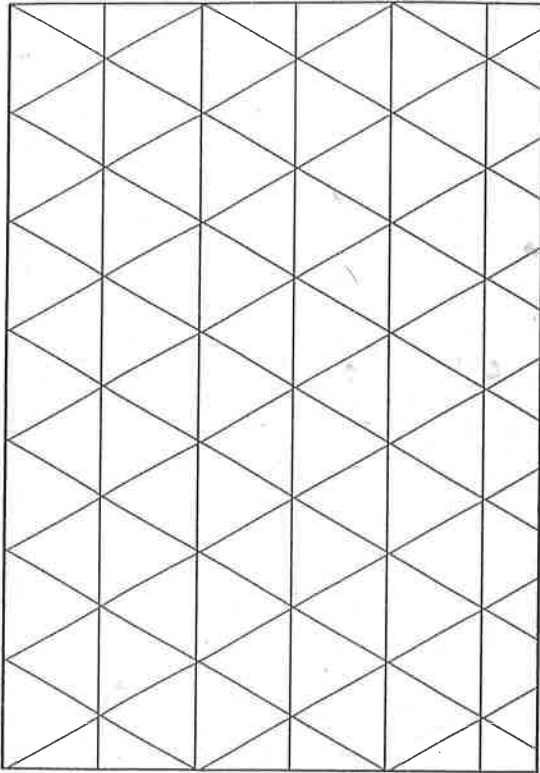
Squares and Rectangles



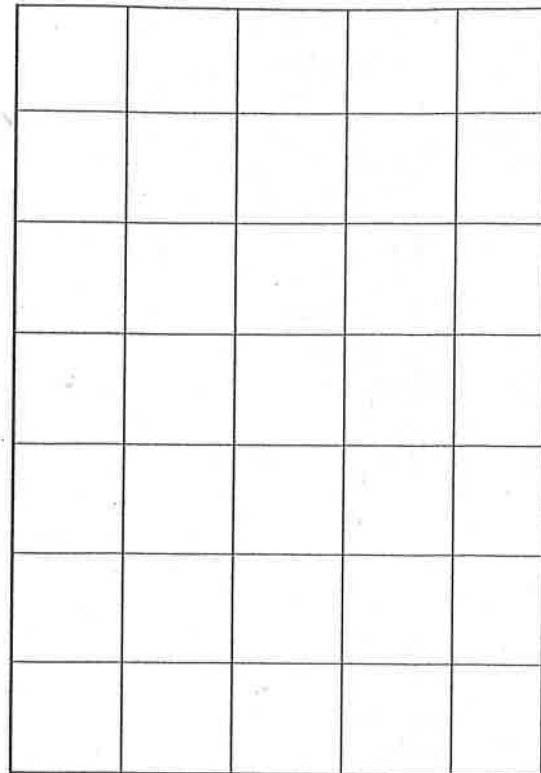
Hexagons and Triangles

Colour the tessellations to design your own mosaic. Show repeating patterns using colour.

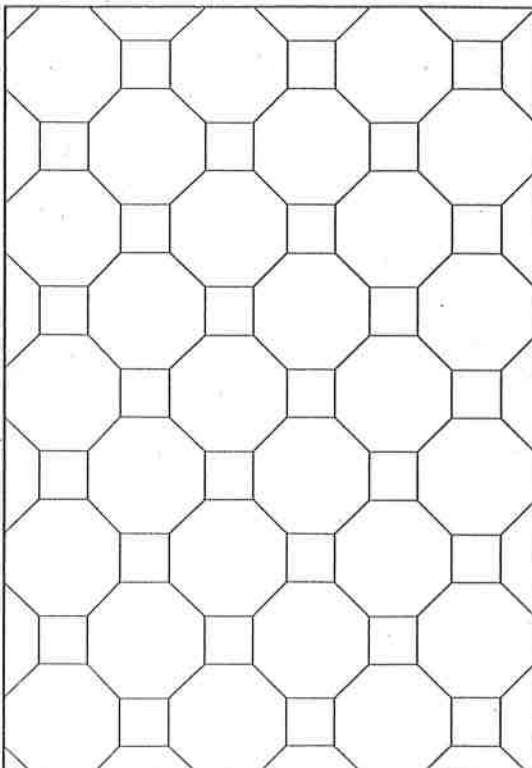
a)



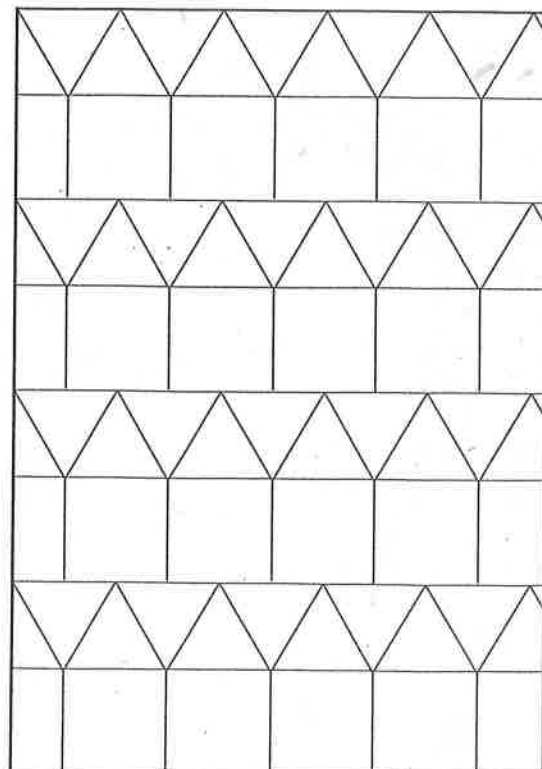
b)



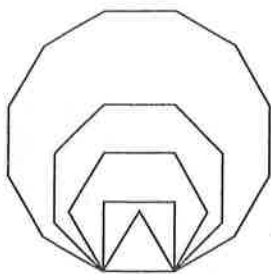
c)



d)



2. Cut out combinations of the regular polygons from page 285 of this chapter to make tessellations about a point. (12 triangles, 6 squares, 4 hexagons, 2 octagons, 1 dodecagon will be needed)



a) 3 triangles, 2 squares

b) 2 triangles, 2 hexagons

c) 1 triangle, 2 squares, 1 hexagon

d) 4 triangles, 1 hexagon

e) 1 square, 2 octagons

f) 2 triangles, 1 square, 1 dodecagon

Polygon cutouts for section 8.3, page 304, question 4

