Warm Up

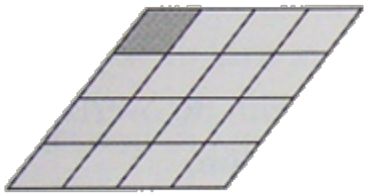
Grade 8

April 27, 2016

Which of these designs are tessellations? Justify your answer.

a)

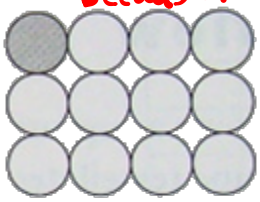
Tessellation



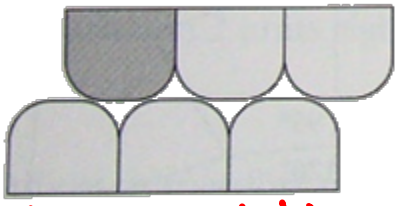
No gaps, No overlaps

b)

Not a tesselation because it has gaps

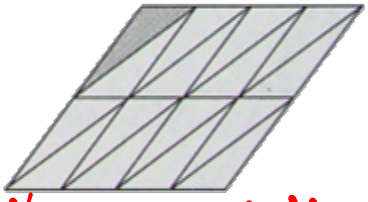


c)



Not tessellation → has gaps

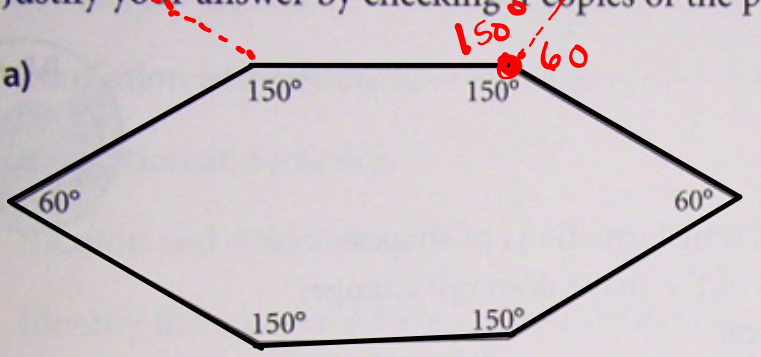
d)



Yes a tesselation → No gaps, No overlaps

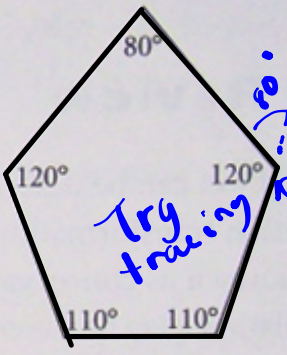
Which of the polygons can be used to create a tessellation?
Justify your answer by checking if copies of the polygon can surround a point.

a)



150 60

b)



try tracing

60 240

Pg467

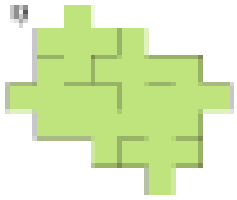
Discuss the Ideas

1. A shape tessellates when copies of it can cover a plane surface without overlaps or gaps. The sum of the angles where vertices meet is 360°.
2. I can tell that a shape does not tessellate when I see overlaps or gaps in the design.

4. The sum of the angles in a triangle is 180°, so combinations of angles in a triangle will add to 360°.
5. The sum of the angles in a quadrilateral is 360°.

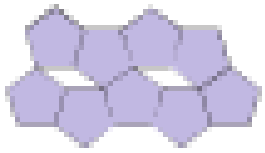
6. a) Which of these designs are tessellations? Justify your answer.

i)



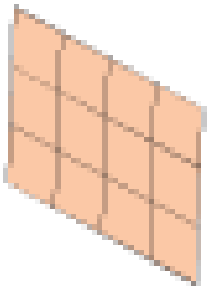
a) i) This design is a tessellation because the shape covers the plane with no overlaps or gaps.

ii)



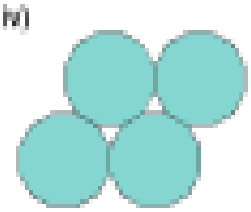
ii) This design is not a tessellation because the regular pentagon does not cover the plane with no overlaps or gaps. There are gaps that are parallelograms.

iii)



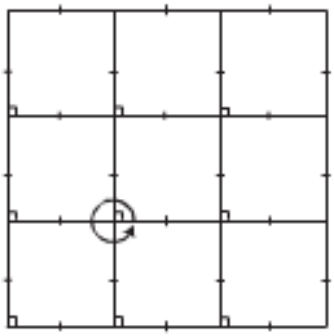
iii) This design is a tessellation because the parallelogram covers the plane with no overlaps or gaps.

iv)

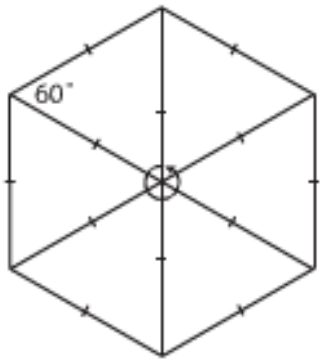


iv) This design is not a tessellation because the regular 12-sided polygon does not cover the plane with no overlaps or gaps. There are gaps that are triangles.

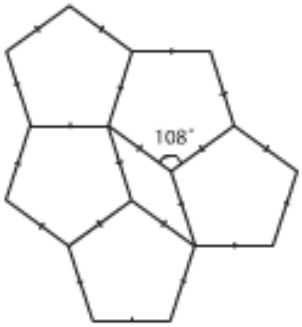
7. a)



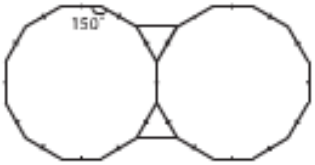
b)



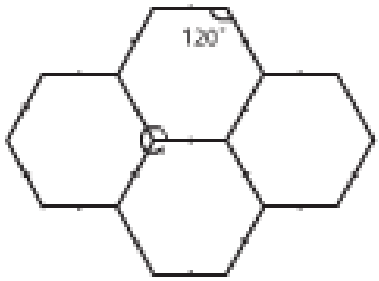
c) No, there are gaps that are parallelograms.



d) No, there are gaps that are triangles.



e)

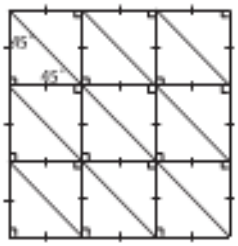


f) No, there are gaps that are irregular hexagons.

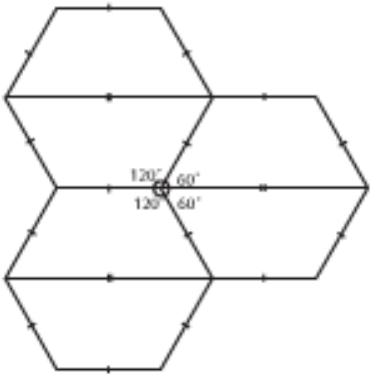
Regular Triangles, Squares and Hexagons will tesselate.

Regular Pentagons, Decagons and Dodecagons (12 sides) will not tesselate, there will be gaps.

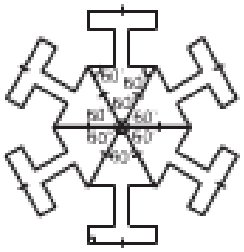
11. a) $45° + 45° + 90° + 45° + 45° + 90° = 360°$



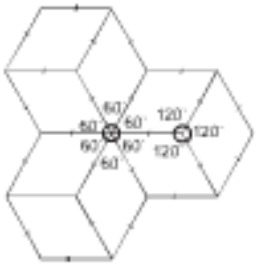
b) $120° + 60° + 120° + 60° = 360°$



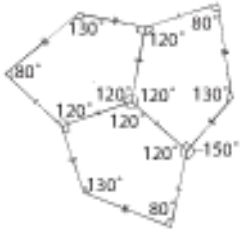
c) Although the triangles can be arranged to surround a point so that the sum of the angles is 360°, there are gaps that cannot be filled.



d) $60° + 60° + 60° + 60° + 60° + 60° = 360°$;
$120° + 120° + 120° = 360°$

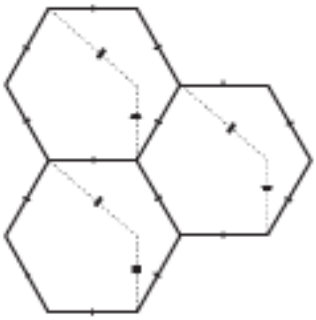


e) The outside angle is 150°. No combination of angles in the shape has a sum of 150°.

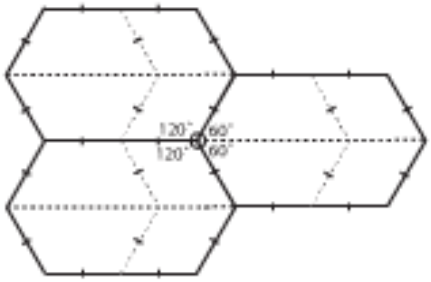


f) I put the 230°, 40°, and 30° angles together. I then needed two 30° angles to fill the gap. When I tried to insert these 2 angles, the shapes did not fit. There were gaps and overlaps.

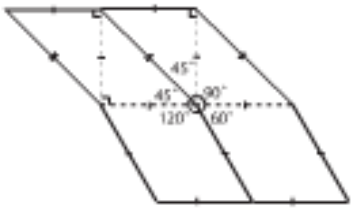
12. a) Answers may vary. For example:
The polygons in parts e and f combine to make a composite shape that tessellates. The design has no gaps or overlaps and the sum of the angles at a point is 360°: 120° + 120° + 90° + 30° = 360°



Two polygons in part b, and 2 polygons in part d combine to ~~make a composite shape that tessellates~~.
120° + 60° + 120° + 60° = 360°



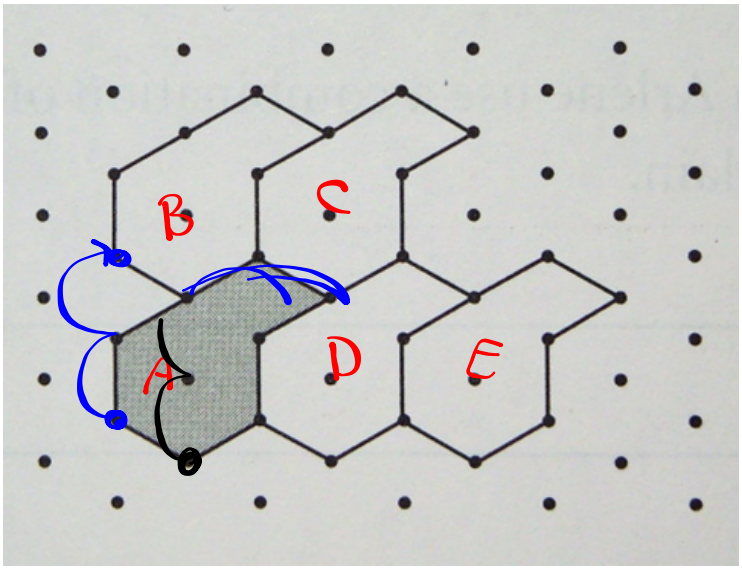
Two polygons in part a and the polygon in part d combine to make a composite shape that tessellates:
90° + 60° + 120° + 45° + 45° = 360°



b) Answers may vary. Students should be able to find at least 4 different composite shapes that tessellate; one being the two right triangles joined together to make a square. Students know that a square tessellates.

14. The composite shape is made from a regular octagon and a square. I know the shape tessellates because the sum of the angles at any point is 360°:
$90° + 135° + 135° = 360°$
(each angle in a regular octagon is 135°).

Identify the transformation in this tessellation.

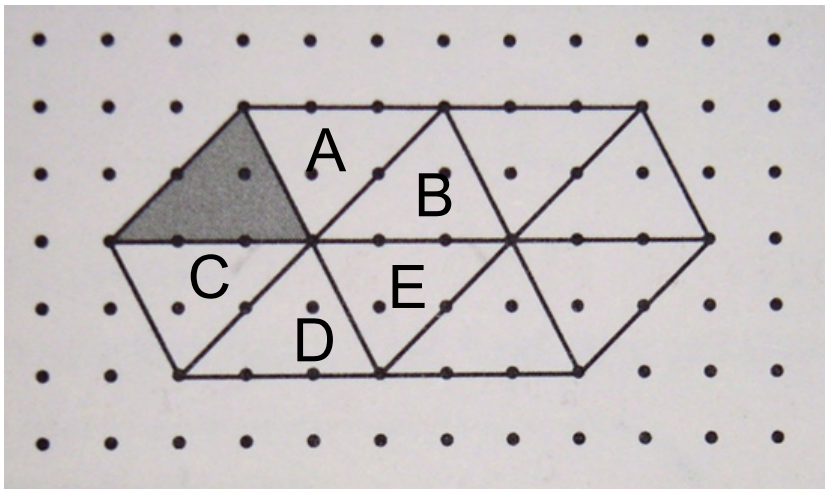


Is it a translation, reflection or rotation?

A→B Translation U2

A→C Translation, U2, R1

Identify the transformations in this tessellation.



How is the shaded triangle related to each tessellation?
(Reflections, rotations, or translations)
Multiple choice:

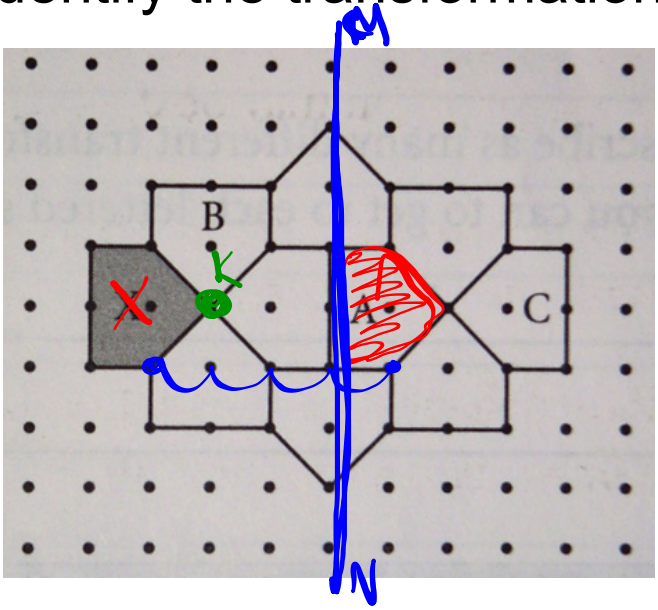
a) ~~Translation~~ & Reflections

b) ~~Translation~~ & rotation

c) rotation & Reflection

conservation of area: under a transformation, the area of a shape does not change.

Identify the transformations in this tessellation.



use words or phrases as "translations, reflection, rotation, vertical line, horizontal line, #units up/ down/left or right, clockwise or counterclockwise.

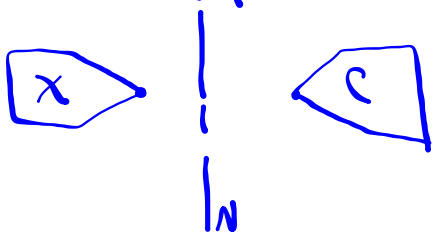
How is the shaded shape related to each tessellation? (Reflections, rotations, or translations)

X to A Translate (1) Right 4 (1)

X to B Rotation of 90° clockwise, about Point K (1) (1)

X to C

Reflection across vertical line MN



pg. 475 # 1,3-6

1, 3, 4, 5, 6

Look at pages 472 - 475
For more examples if you are struggling

Test Tuesday May 3 on Unit 8

Read page 482