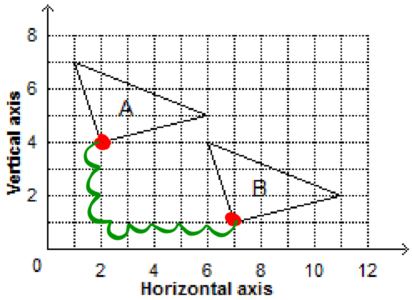
Warm Up

Grade 8

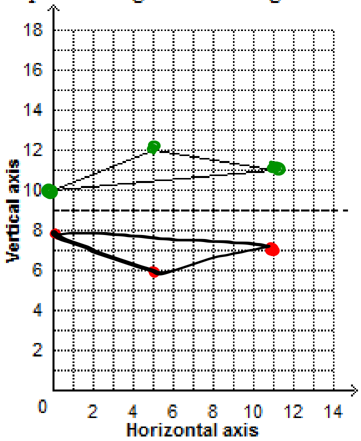
April 26, 2016

1. Triangle B is a translation image of Triangle A. Describe the translation.

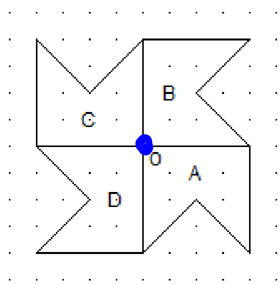


A → B
Down 3, Right 5
(D3, R5)

2. This triangle is reflected in a horizontal line through the point (0, 9). Graph the image of the triangle on the same coordinate grid.



3. Use this diagram to identify each transformation.



a) Shape B is the image of Shape A.
b) Shape C is the image of Shape A.
c) Shape D is the image of Shape A.

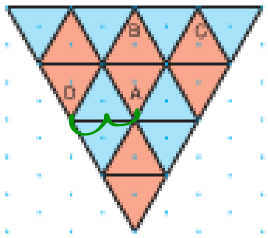
a) A → B
Rotate 90° Counter Clockwise about Point O

b) A → C
Rotation about Point O, 180°

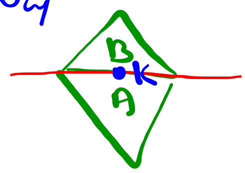
c) A → D
Rotation 90° clockwise about point O

1. Two shapes have opposite orientations when one shape faces one direction, and the other shape faces the opposite direction.
2. Each point on the original shape is the same distance from the line of reflection as the corresponding point on the image. The line segment that joins these points is perpendicular to the line of reflection.
3. Square B is rotated 180° about the point which is the centre of the middle square in the design.
4. No; when a shape is transformed, each image is always congruent to the original shape.

5. In the design below, identify each transformation.



5a)

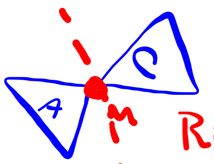


line of Reflection

Or

Rotate 180° about Point K

5b)



Rotate 180° about Point m.

line of reflection

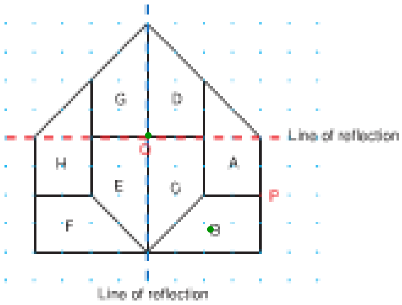
5. a) Shape A is reflected in the side shared by Shapes A and B; or, Shape A is rotated 180° about the midpoint of the side shared by Shapes A and B.

b) Shape A is rotated 180° about the vertex shared by Shapes A and C; or, Shape A is reflected in the diagonal line that passes through the vertex shared by Shapes A and C and a side of Shape B.

c) Shape A is translated 1 unit left; or Shape A is rotated 120° clockwise about the vertex shared by Shapes A and D; or Shape A is reflected in a vertical line midway between Shapes A and D.

d) Shape B is translated 1 unit right; or Shape B is reflected in a vertical line midway between Shapes B and C.

6. Use this design.



Match each transformation to a transformation image.

a) Rotate Shape A 90° counterclockwise about point P. B

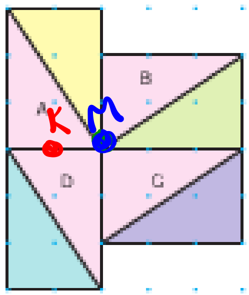
b) Reflect Shape C in the red line of reflection. D

c) Translate Shape D 2 units right and 2 units down. A

d) Rotate Shape G 180° about point Q. E

e) Reflect Shape B in the blue line of reflection. F

7. Identify each transformation.



a) Shape A is the image of Shape B. B → A

b) Shape B is the image of Shape C. C – B

c) Shape C is the image of Shape D. D → C

d) Shape D is the image of Shape A. A → D

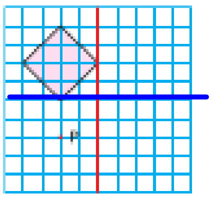
7. a) Shape B is rotated 90° counterclockwise about the vertex M shared by Shapes A and B.

b) Shape C is translated 2 units up.

c) Shape D is rotated 90° counterclockwise, or 270° clockwise, about the vertex shared by Shapes C and D.

d) Shape A is rotated 180° about the midpoint K of the side shared by Shapes A and D.

8. On grid paper, copy this square, the red and blue lines, and point P.



Draw the image of the original square after each transformation to create a design.

a) a translation 2 units right

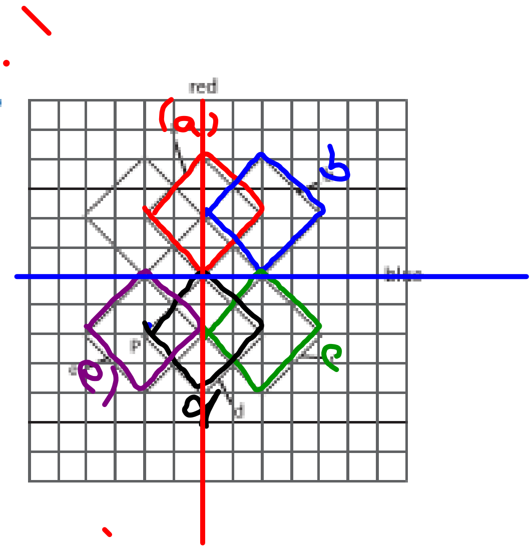
b) a reflection in the red line

c) a rotation of 90° clockwise about P

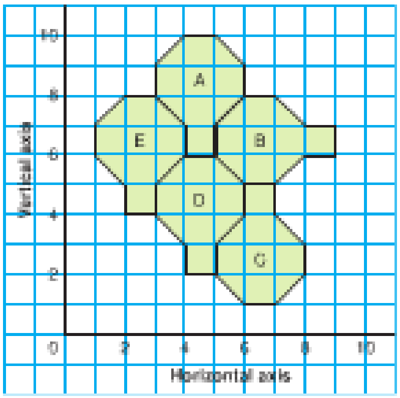
d) a translation 2 units right and 4 units down

e) a reflection in the blue line

8.



9. **Assessment Focus** How many different ways can each shape be described as a transformation of another shape? Explain.



9. Shape A is translated 4 units down to get Shape D. Shape A is translated 2 units left and 2 units down to get Shape E. Shape A is rotated 180° about point (5.5, 5.5) to get Shape C. Shape A is rotated 90° counterclockwise about point (6.5, 8.5) to get Shape B.

Shape B is rotated 90° clockwise about point (6.5, 8.5) to get Shape A. Shape B is rotated 90° clockwise about point (4.5, 6.5) to get Shape D. Shape B is rotated 90° clockwise about point (4.5, 8.5) to get Shape E. Shape B is rotated 90° counterclockwise about point (8.5, 4.5) to get Shape C.

Shape C is rotated 90° clockwise about point (8.5, 4.5) to get Shape B. Shape C is rotated 180° about point (5.5, 5.5) to get Shape A. Shape C is rotated 180° about point (4.5, 4.5) to get Shape E. Shape C is rotated 180° about point (5.5, 3.5) to get Shape D.

Shape D is translated 4 units up to get Shape A. Shape D is translated 2 units left and 2 units up to get Shape E. Shape D is rotated 180° about point (5.5, 3.5) to get Shape C. Shape D is rotated 90° counterclockwise about point (4.5, 6.5) to get Shape B.

Shape E is translated 2 units right and 2 units up to get Shape A. Shape E is translated 2 units right and 2 units down to get Shape D. Shape E is rotated 90° counterclockwise about point (4.5, 8.5) to get Shape B. Shape E is rotated 180° about point (4.5, 4.5) to get Shape C.

Constructing Tessellations

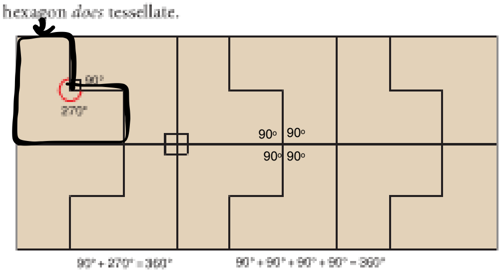
When congruent copies of a shape cover a plane with no overlaps or gaps, we say the shape tessellates.

The design created is called a tessellation.

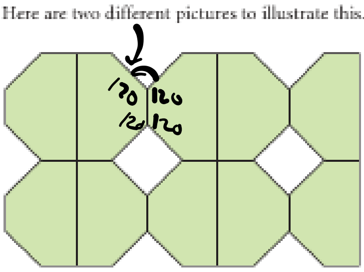
For copies of a polygon to tessellate, the **sum of the angles at any given point where vertices meet must be 360.**

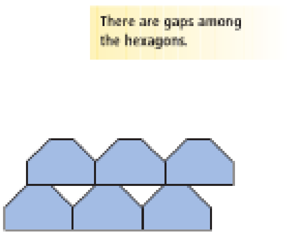
*Not all shapes tessellates

➤ This hexagon *does* tessellate.



➤ This hexagon *does not* tessellate.
Here are two different pictures to illustrate this.



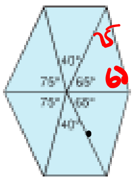


In *Investigate*, you found that triangles and quadrilaterals tessellate.

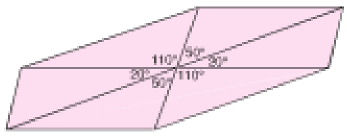
At any point where vertices meet, the sum of the angle measures is 360°.

All triangles and quadrilaterals will tessellate.

Acute triangle



Obtuse triangle

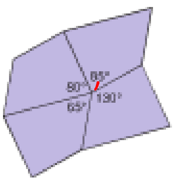


Six congruent triangles surround a point.

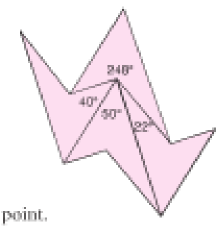
At each point:
75° + 40° + 65° + 65° + 40° + 75° = 360°

At each point:
20° + 50° + 110° + 20° + 50° + 110° = 360°

Convex quadrilateral



Concave quadrilateral



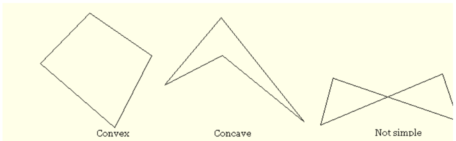
Four congruent quadrilaterals surround a point.

At each point:
80° + 85° + 130° + 65° = 360°

At each point:
50° + 40° + 22° + 248° = 360°

It is also possible for combinations of shapes to tessellate.

A quadrilateral that is concave has an angle exceeding 180°. In either case, the quadrilateral is *simple*, which means that the four sides of the quadrilateral only meet at the vertices, two at a time. So that two non-adjacent sides do not cross. A quadrilateral that is not simple is also known as *self-intersecting* to indicate that a pair of his non-adjacent sides intersect.

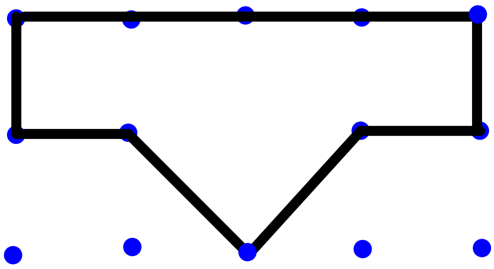


Discuss examples

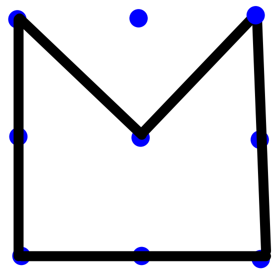
Does the shape tessellate? (You actually have to trace it out. My want to cut an image out and move around)

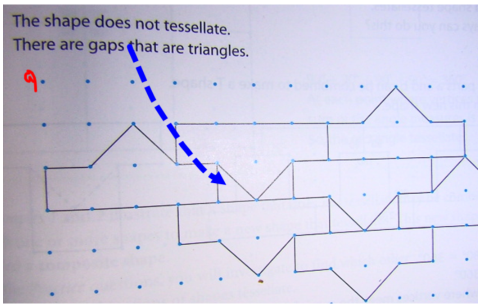
Do on Black board

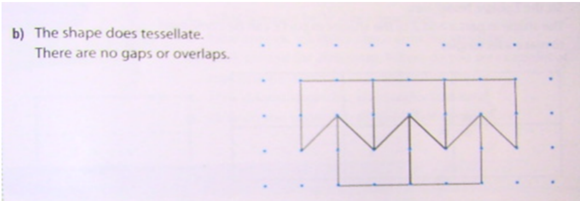
a)



b)




The shape does not tessellate.
There are gaps that are triangles.


b) The shape does tessellate.
There are no gaps or overlaps.

Class/Homework

look at example 2 on page 466

page 467

#6, 7(trace out and try),#11, #12, #14

abce

a
b
c
f