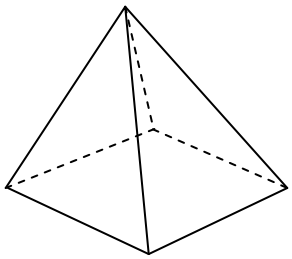
Note: This is NOT a practice exam. It is a collection of problems to help you review some of the material for the exam and to practice some kinds of problems. This collection is not necessarily exhaustive; you should expect some problems on the exam to look different from these problems.

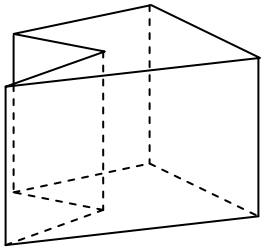
Section 9.3

Textbook p 643 # 10, 11

1. Give the most precise name you can for this polyhedron.



2. Give the most precise name you can for this polyhedron.



3. Determine for each of the following the smallest number of **faces** possible:
   a. Prism
   b. Pyramid
   c. Polyhedron

4. A certain polyhedron has 10 vertices and 18 edges. Could it be a prism? Explain. Could it be a pyramid? Explain.

5. Can a prism have exactly 33 edges? Explain how you know. Can a pyramid have exactly 33 edges? Explain how you know.

6. A certain polyhedron has 9 faces and 10 vertices. Could it be a prism? Explain. Could it be a pyramid? Explain.

7. Name by type (e.g., triangular prism) what kind of polyhedron would have the features described in each case. It is not possible to have the polyhedron described, explain why.

a. A prism with 101 edges

b. A prism with 101 vertices.

c. A prism with 101 faces.

d. A pyramid with 10 edges.

e. A pyramid with 101 faces.

f. A pyramid with 101 edges.

ANSWERS Section 9.3

Answers to Chapter Test questions are in the back of the text.

1. A square pyramid. (A right square pyramid is an OK answer.)

2. A pentagonal prism. (A right pentagonal prism is an OK answer.)

3 a. A triangular prism has 5 faces.
b. A triangular pyramid has 4 faces.
c. Any polyhedron must have at least 4 faces.

4. A nonagonal pyramid. To be a prism with 10 vertices, you must have a pentagonal prism, with 5 vertices at each base. But this prism would have 15 edges: 5 at each base and 5 between the bases. To be a pyramid with 10 vertices, you must have a nonagonal pyramid, with 9 vertices around the base, and the tenth at the apex. This pyramid would indeed have 18 edges—9 around the base and nine more going up to the apex.

5. Yes—an 11-gon prism has 33 edges: eleven at each base and eleven more between the bases. No—a pyramid cannot have 33 edges, since the number of edges around the base is equal to the number from the base to the apex, the number of edges must be even.

6. The polyhedron is not a pyramid and not a prism.

7. a. Not possible
b. Not possible
c. A 99-gon prism
d. A pentagonal pyramid
e. A 100-gon pyramid
f. Not possible
g. A nonagonal pyramid.

Section 9.4

Textbook p 643 # 10, 11

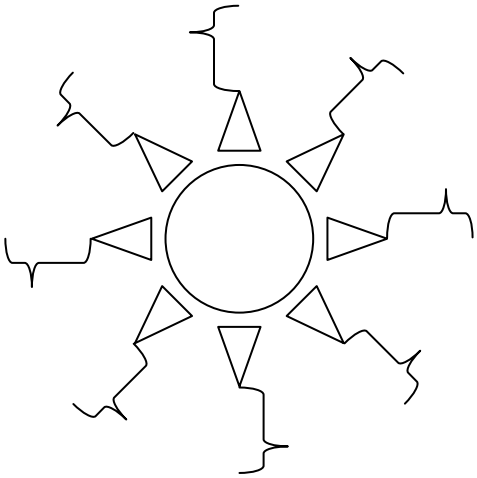
1. For each condition below, sketch a triangle that satisfies the condition. If it is not possible to sketch such a triangle, state briefly why it is not possible.

a. It has no lines of symmetry.
b. It has exactly one line of symmetry.
c. It has exactly two lines of symmetry.
d. It has exactly three lines of symmetry.

2. If possible, carefully sketch an example of each figure. If the figure described is not possible, briefly indicate why. Include in your sketches any lines of symmetry and indicate any angle(s) of rotational symmetry.

a) A quadrilateral that has rotational symmetry but no reflection symmetry.
b) A quadrilateral that has both rotational and reflection symmetry.

3. Identify all forms of symmetry shown in this design.



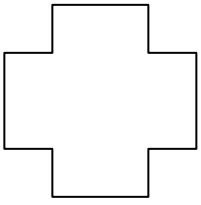
4. What forms of symmetry are in a capital letter H?

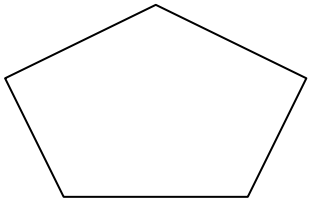
H

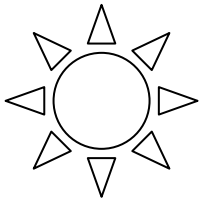
5. What forms of symmetry are in a capital letter N?

N

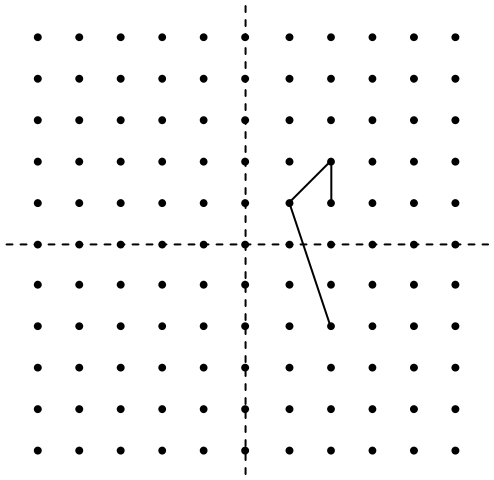
6. Determine the types of symmetry that each figure has. Sketch the lines of symmetry if it has reflection symmetry; indicate the number and angles of rotation symmetries if it has rotation symmetry.

A. 

B. 

C. 

7. Complete the figure below so that it is symmetric about both dashed lines.

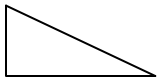


ANSWERS Section 9.4

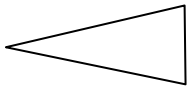
Answers to Chapter Test questions are in the back of the text.

1. For each condition below, sketch a triangle that satisfies the condition. If it is not possible to sketch such a triangle, state briefly why it is not possible.

e. It has no lines of symmetry.



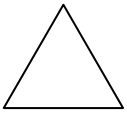
f. It has exactly one line of symmetry.



g. It has exactly two lines of symmetry.

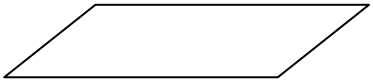
It is not possible to make a triangle with exactly two lines of symmetry. Each line of symmetry implies a pair of congruent sides. So a figure with only three sides to have two pairs of symmetric sides, all three sides must be congruent. But that means you have an equilateral triangle, which has three lines of symmetry.

h. It has exactly three lines of symmetry.

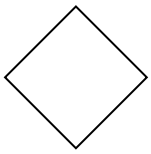


2. Possible solutions are shown below.

a) A quadrilateral that has rotational symmetry but no reflection symmetry.



b) A quadrilateral that has both rotational and reflection symmetry.



3. The figure has 8 rotation symmetries: 45°, 90°, 135°, etc.

4. The capital H has two lines of reflection symmetry and 2 rotation symmetries.

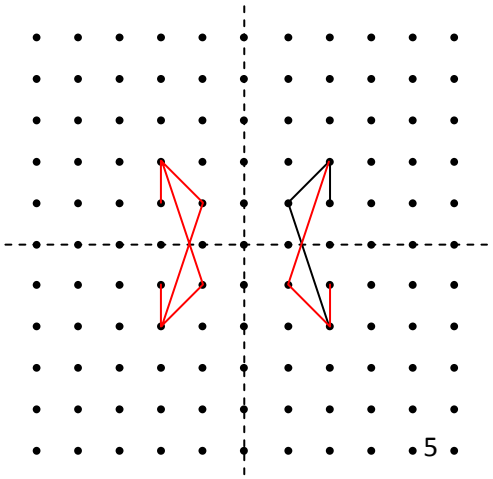
5. The capital N has 2 rotation symmetries.

6. A. The figure has reflection symmetry with 4 lines of symmetry: 1 horizontal, 1 vertical, and 2 diagonal. It also has 4 rotation symmetries, at 90 degree intervals (so at 90, 180, 270, and 360 degrees).

B. The figure has reflection symmetry, with one vertical line of symmetry. There are no rotation symmetries. (The figure would have more lines of symmetry and 5 rotation symmetries if it was a regular pentagon, but it is clear from the picture that the pentagon is NOT regular).

C. The figure has reflection symmetry, with 8 lines of symmetry. 4 of the lines cut directly down the center of the triangles; the other 4 fall directly between pairs of triangles. The figure also has 8 rotation symmetries. They are at 45 degree intervals (so at 45, 90, 135, 180, 225, 270, 315, and 360 degrees). You can figure this out once you recognize there are 8 of them by taking 360/8.

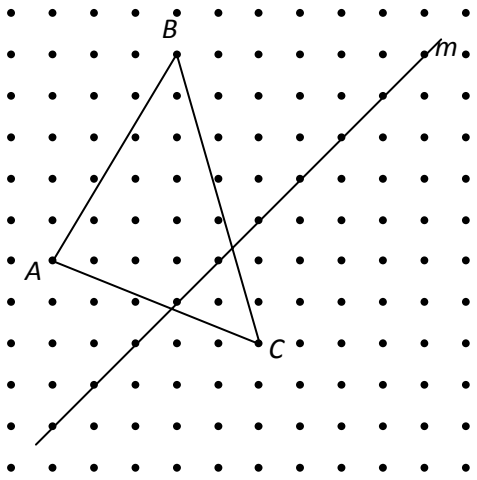
7. The completed design is:



Section 11.2

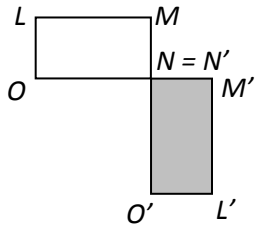
Textbook p 802 # 5

1. Sketch the image of triangle *ABC* after a reflection across line *m* and label it *A'B'C'*.

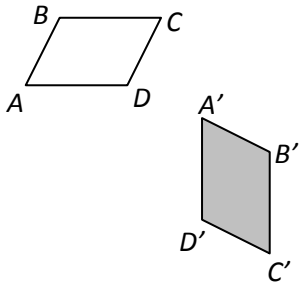


2. Identify which transformation (translation, reflection, or rotation) would change each polygon to the corresponding shaded image. For an answer of "reflection," sketch the line of reflection. For an answer of "rotation," indicate the approximate location of the center of rotation.

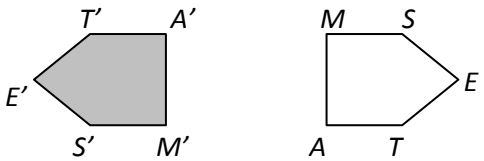
a.



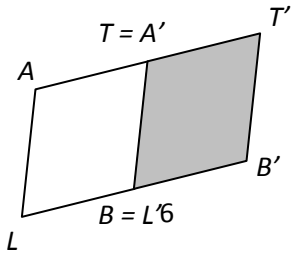
b.



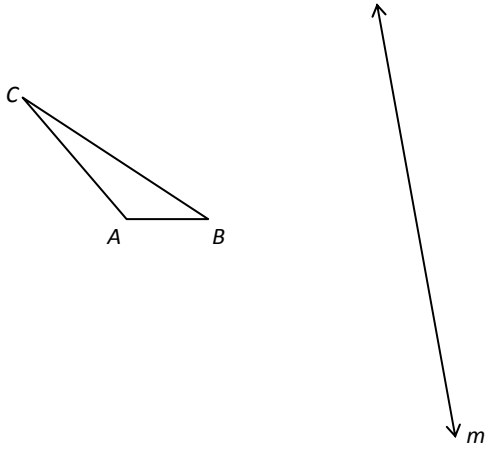
c.



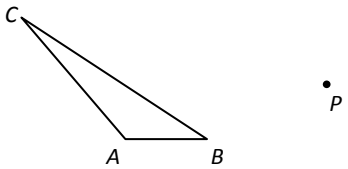
d.



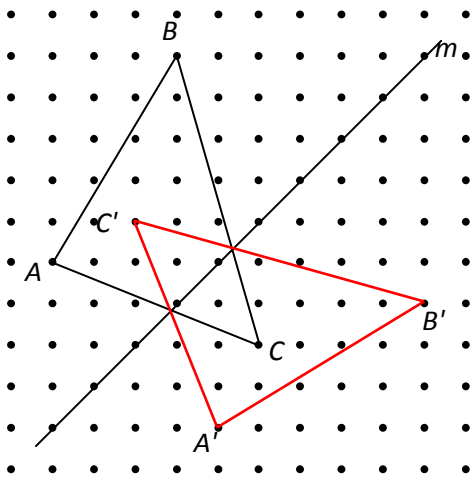
3. Using a protractor and compass, sketch the image of triangle *ABC* after a reflection across line *m* and label it *A´B´C´*.



4. Using a protractor and compass, sketch the image of triangle *ABC* after a clockwise rotation of 75° about the point *P*. Label the image *A´B´C´*.

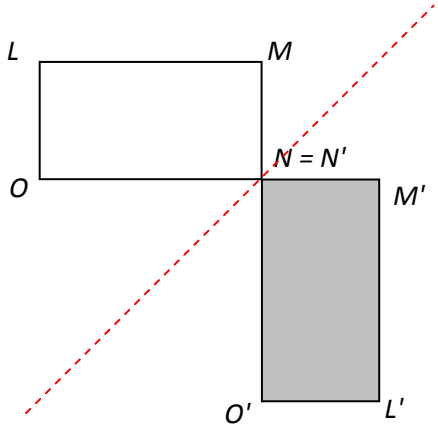


ANSWERS Section 11.2
Answers to Chapter Test questions are in the back of the text.
1. Sketch the image of triangle *ABC* after a reflection across line *m* and label it *A'B'C'*.



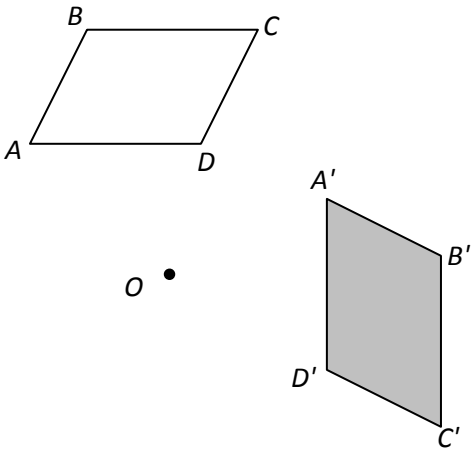
2. Answers shown on the figures below.

a.



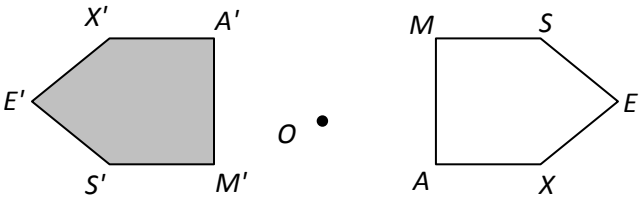
Reflection about the line shown here.

b.



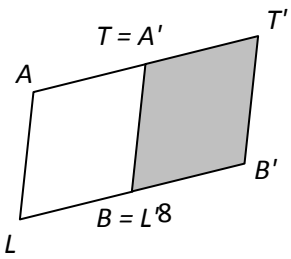
Rotation of 90˚ about *O*. You should be able to approximate the location of *O*.

c.



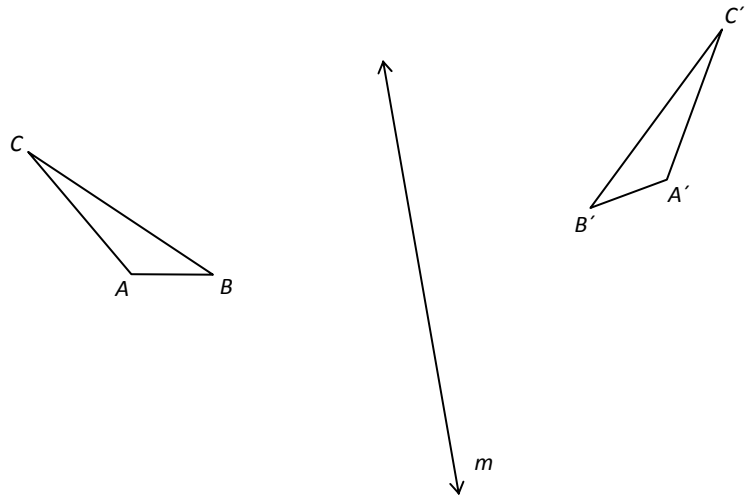
Rotation of 180˚ about *O*. You should be able to approximate the location of *O*.

d.



Translation.

3. The reflection looks something like what is shown here.



4. The rotation looks something like what is shown here.