





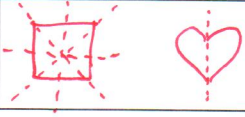
PATTERNS AND FUNCTIONS

5

Name: Key Date: _____ Period: _____

SECTION 5.2 TRANSLATIONS AND REFLECTIONS

VOCABULARY

DEFINITION	EXAMPLE
Translation: a transformation that slides a figure	
Congruent: shapes with the same size and shape	
Reflection: a "mirrored image" of a figure	
Line of reflection: acts as a mirror for points the same distance from the line	
Line of symmetry: line of reflection for a figure, where a figure could be folded in half	

Big Idea: How do we translate and reflect points and figures on the coordinate plane?

EXPLORATION 1

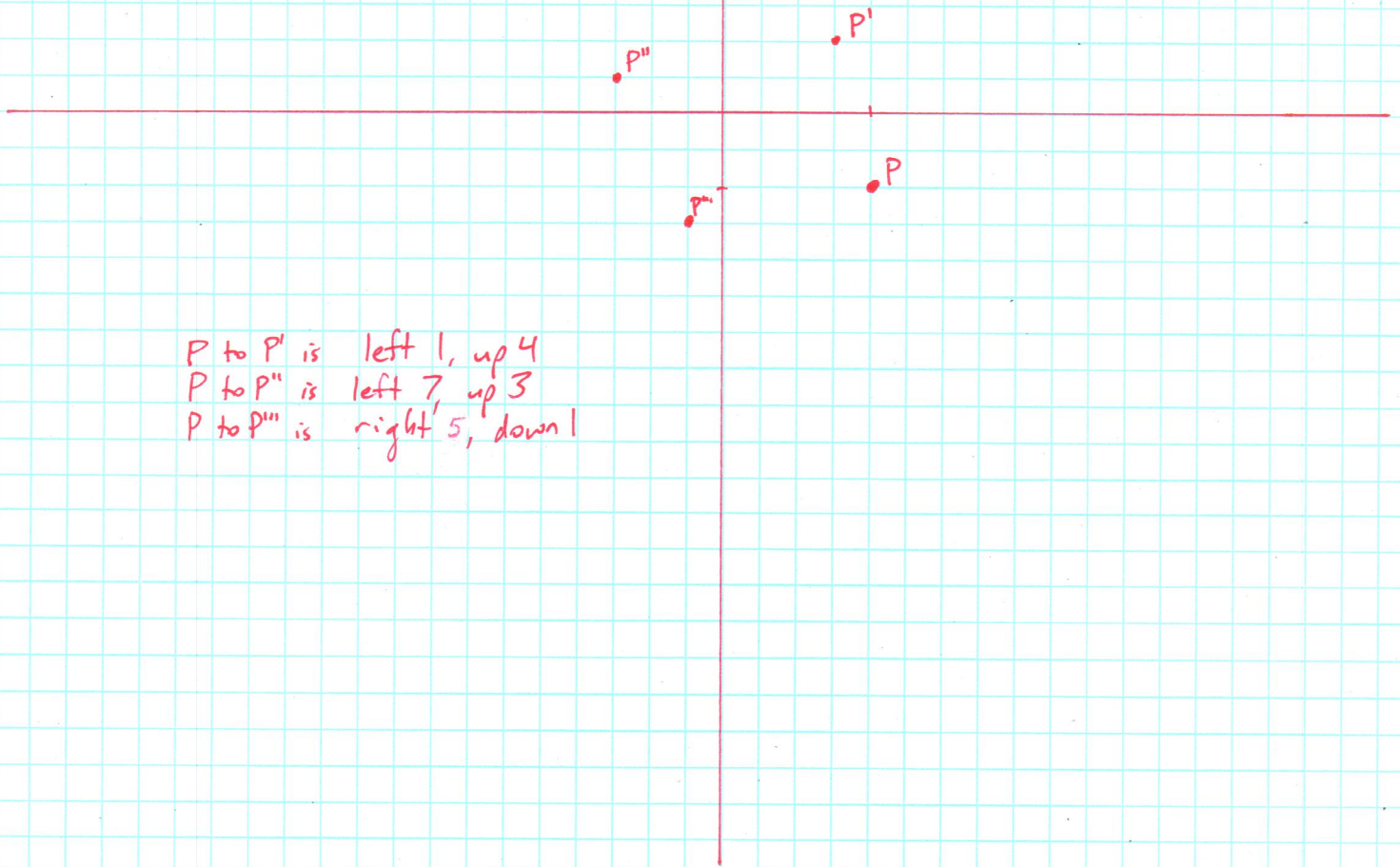
On a piece of graphing paper, draw the vertical and horizontal axes approximately centered on the paper. Locate and label the point P (4, -2).

- Move this point to the location (3, 2) in the first quadrant with both coordinates as positive integers. Label the new location P' (read as P prime) to distinguish that this is where P has moved. Describe carefully how you did it, using directional terms (for example; up, down, right, left). *left 1, up 4*
- Now move point P' to (-3, 1) in the second quadrant and call it P'' (read as P double prime). Move P'' to the location (-1, -3) and label it P''' . Restrict the movement only from grid points to grid points, not just horizontally or vertically.

Describe how points P', P'', and P''' relate to point P, with respect to x-axis and y-axis movement. How many horizontal and vertical movements were needed to get to the new locations?

see graph paper.

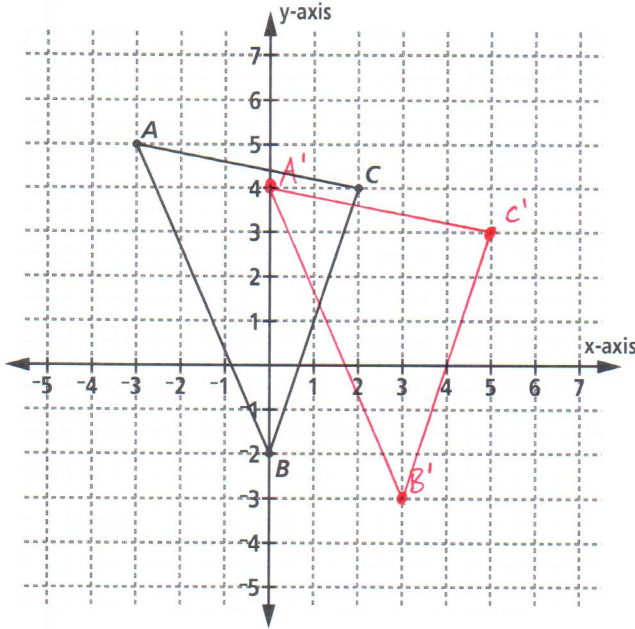
Math Explorations Part 2
Section 5.2
Exploration 1



P to P' is left 1, up 4
 P to P'' is left 7, up 3
 P to P''' is right 5, down 1

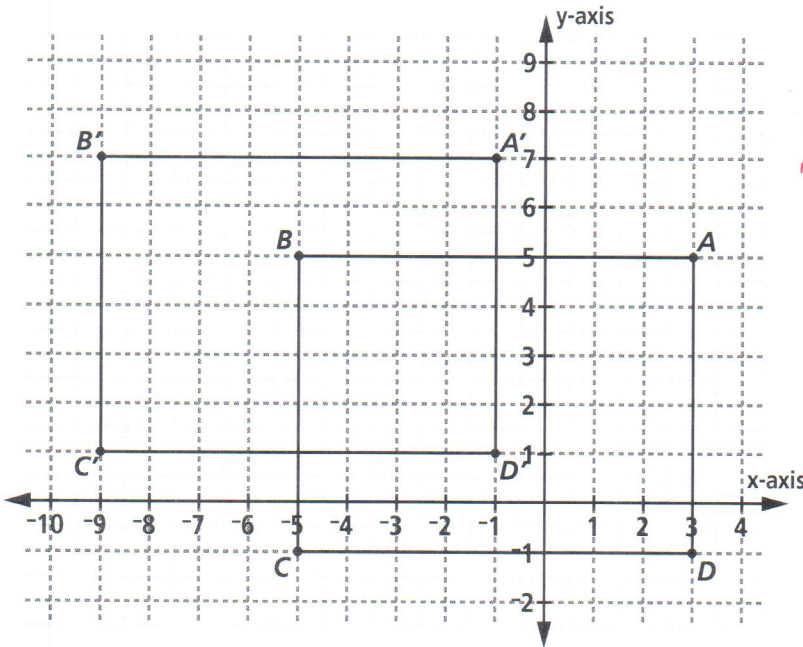
EXAMPLE 1

Translate triangle ABC, written $\triangle ABC$, below using the rule "add 3 to the x-coordinate and subtract 1 from the y-coordinate."



EXAMPLE 2

Describe the translation rule if rectangle ABCD translates to A'B'C'D':



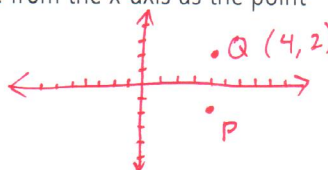
left 4 and up 2
 "subtract 4 from the x-coordinate and add 2 to the y-coordinate"

(x, y) goes to $(x - 4, y + 2)$

EXPLORATION 2

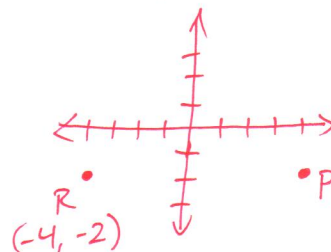
- a. Determine the distance from P (4, -2) to the x-axis. Locate and label a point Q in the first quadrant with first coordinate 4 that is the same distance from the x-axis as the point P (4, -2). Describe how you chose the location for Q.

P is 2 units from the x-axis, so Q is as well.



- b. Determine the distance from P to the y-axis. Move from point P across the y-axis to the third quadrant to the new point R that is the same distance from the y-axis as P. Describe how you chose the location for R.

P is 4 units from the y-axis, so R is as well.

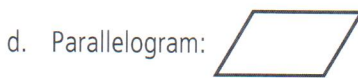


EXAMPLE 4

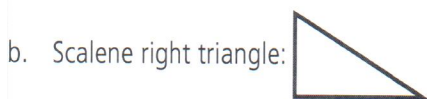
Examine the following examples of the indicated shapes to determine whether they have **lines of symmetry**, how many they have, and where the lines of symmetry are situated.



*yes
3 lines of symmetry*



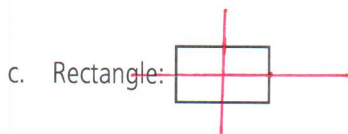
no lines of symmetry



no lines of symmetry



*yes
1 line of symmetry*



*yes
2 lines of symmetry*

PRACTICE EXERCISES

1. Plot the following points and translate them using the rule "add 3 to the x-coordinate and subtract 4 from the y-coordinate."

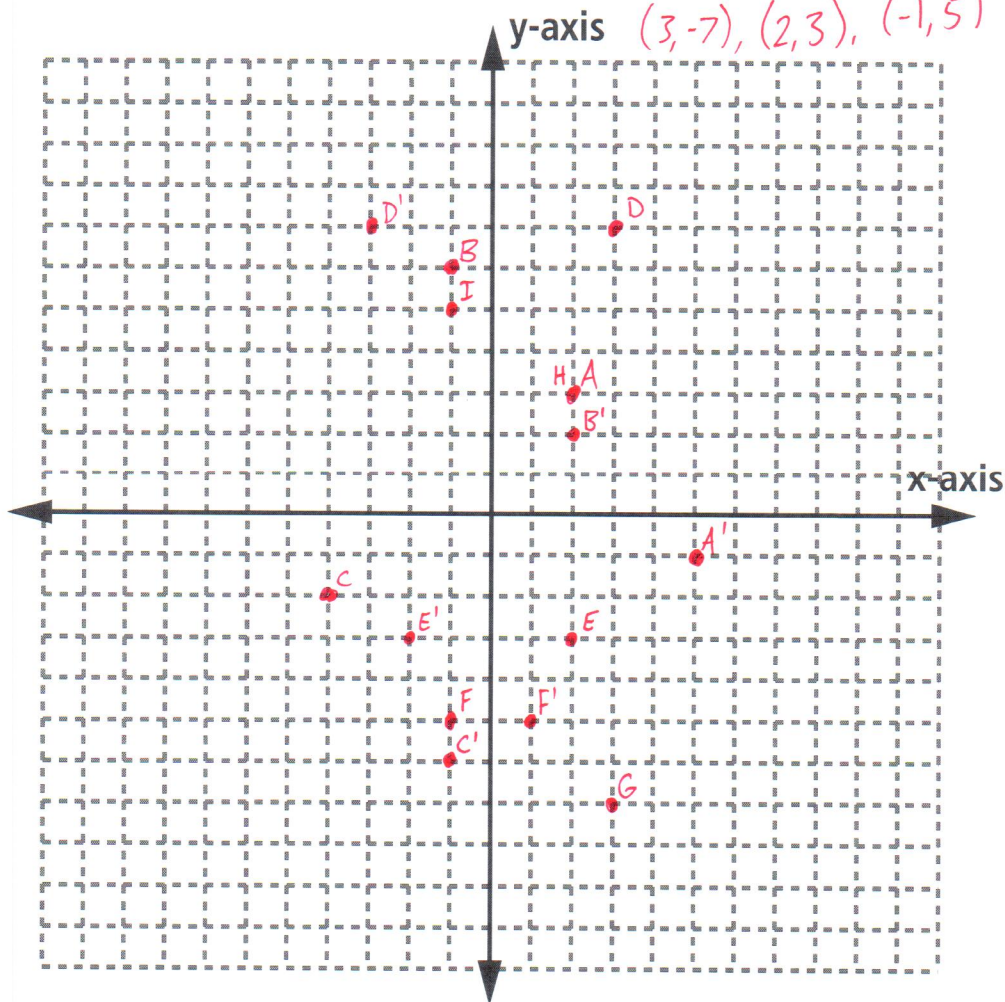
- | | | |
|-----------------------|------------------------|--------------------------|
| a. ^A (2,3) | b. ^B (-1,6) | c. ^C (-4, -2) |
| ^{A'} (5, -1) | ^{B'} (2, 2) | ^{C'} (-1, -6) |

2. Plot the following points and reflect across the y-axis.

- | | | |
|------------------------|-------------------------|--------------------------|
| a. ^D (3, 7) | b. ^E (2, -3) | c. ^F (-1, -5) |
| ^{D'} (-3, 7) | ^{E'} (-2, -3) | ^{F'} (1, -5) |

3. Reflect the points from Practice Problem 2 across the x-axis.

^{G, H, I}
^{(3, -7), (2, 3), (-1, 5)}



SUMMARY (What I learned today)
