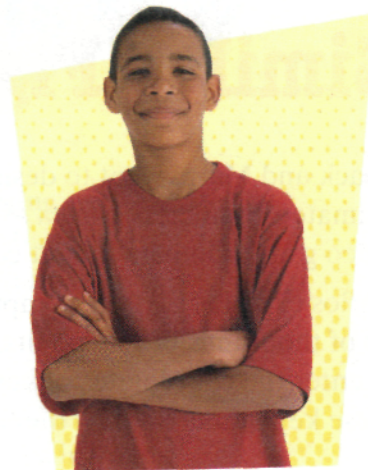


2.1 Drawing Wumps

Zack and Marta's computer game involves a family called the Wumps. The members of the Wump family are various sizes, but they all have the same shape. That is, they are similar. Mug Wump is the game's main character. By enlarging or reducing Mug, a player can transform him into other Wump family members.

Zack and Marta experiment with enlarging and reducing figures on a coordinate grid. First, Zack draws Mug Wump on graph paper. Then, he labels the key points from A to X and lists the coordinates for each point. Marta writes the rules that will transform Mug into different sizes.



Problem 2.1 Making Similar Figures

Marta tries several rules for transforming Mug into different sizes. At first glance, all the new characters look like Mug. However, some of the characters are quite different from Mug.

- A.** To draw Mug on a coordinate graph, refer to the “Mug Wump” column in the table on the next page. For parts (1)–(3) of the figure, plot the points in order. Connect them as you go along. For part (4), plot the two points, but do not connect them. When you are finished, describe Mug's shape.
- B.** In the table, look at the columns for Zug, Lug, Bug, and Glug.
1. For each character, use the given rule to find the coordinates of the points. For example, the rule for Zug is $(2x, 2y)$. This means that you multiply each of Mug's coordinates by 2. Point A on Mug is $(0, 1)$, so the corresponding point on Zug is $(0, 2)$. Point B on Mug is $(2, 1)$, so the corresponding point B on Zug is $(4, 2)$.
 2. Draw Zug, Lug, Bug, and Glug on separate coordinate graphs. Plot and connect the points for each figure, just as you did to draw Mug.
- C.**
1. Compare the characters to Mug. Which are the impostors?
 2. What things are the same about Mug and the others?
 3. What things are different about the five characters?

ACE Homework starts on page 28.

active math
online

For: Mug Wumps, Reptiles,
and Sierpinski Triangles
Activity

Visit: PHSchool.com

Web Code: and-2201

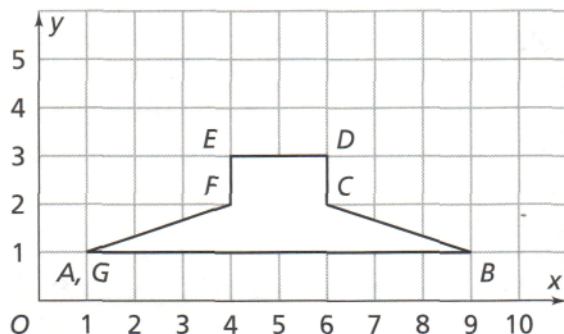
Coordinates of Game Characters

	Mug Wump	Zug	Lug	Bug	Glug
Rule	(x, y)	$(2x, 2y)$	$(3x, y)$	$(3x, 3y)$	$(x, 3y)$
Point	Part 1				
<i>A</i>	(0, 1)	(0, 2)			
<i>B</i>	(2, 1)	(4, 2)			
<i>C</i>	(2, 0)				
<i>D</i>	(3, 0)				
<i>E</i>	(3, 1)				
<i>F</i>	(5, 1)				
<i>G</i>	(5, 0)				
<i>H</i>	(6, 0)				
<i>I</i>	(6, 1)				
<i>J</i>	(8, 1)				
<i>K</i>	(6, 7)				
<i>L</i>	(2, 7)				
<i>M</i>	(0, 1)				
Part 2 (Start Over)					
<i>N</i>	(2, 2)				
<i>O</i>	(6, 2)				
<i>P</i>	(6, 3)				
<i>Q</i>	(2, 3)				
<i>R</i>	(2, 2)				
Part 3 (Start Over)					
<i>S</i>	(3, 4)				
<i>T</i>	(4, 5)				
<i>U</i>	(5, 4)				
<i>V</i>	(3, 4)				
Part 4 (Start Over)					
<i>W</i>	(2, 5) (make a dot)				
<i>X</i>	(6, 5) (make a dot)				

2.2 Hats Off to the Wumps

Zack experiments with multiplying Mug's coordinates by different whole numbers to make other characters. Marta asks her uncle how multiplying the coordinates by a decimal or adding numbers to or subtracting numbers from each coordinate will affect Mug's shape. He gives her a sketch for a new shape (a hat for Mug) and some rules to try.

Mug's Hat



Problem 2.2 Changing a Figure's Size and Location

- Look at the rules for Hats 1–5 in the table. Before you find any coordinates, predict how each rule will change Mug's hat.
- Copy and complete the table. Give the coordinates of Mug's hat and the five other hats. Plot each new hat on a separate coordinate grid and connect each point as you go.

Rules for Mug's Hat

	Mug's Hat	Hat 1	Hat 2	Hat 3	Hat 4	Hat 5
Point	(x, y)	$(x + 2, y + 3)$	$(x - 1, y + 4)$	$(x + 2, 3y)$	$(0.5x, 0.5y)$	$(2x, 3y)$
A	(1, 1)					
B	(9, 1)					
C						
D						
E						
F						
G						