ALGEBRA WALK PROCEDURE:

1) Before going outside, give each student a data sheet (BC-1 Resource Page) and at least one colored card with one of the integers between -6 and 6, written on the left half of the card. There should be thirteen cards for each color, one for each x-value. Each color relates to one of the equations in BC-1 parts (a) through (e). Each student will also need a pencil for sketching the "human graphs" while outdoors.

2) Once outside, situate students so they are facing the x-axis, looking toward the positive y direction. This orientation is important because it corresponds to the standard orientation we use when graphing.

   Call for students with red cards to find their places along the horizontal axis. The students should stand with both feet on the x-axis facing the positive "y" direction, with their backs to the rest of the class. Start with BC-1 part (a), $y = 2x + 1$. Give the following directions: "Be sure you are standing on the mark that corresponds to the number on your card. Look at the number. Multiply it by 2. Add one. (Pause) Got it? Record the resulting number on your resource page. When I say 'go,' take that number of paces forward or backward. A 'pace' is the distance between two marks on the vertical axis. Ready? GO!"

   Mistakes will be made. Encourage students to help each other out. In most cases, the students will handle corrections themselves. Resist the urge to manage this yourself.

3) Have the student observers complete the appropriate section of their data sheet. They should roughly sketch and describe each shape they see. You may need to modify the sheet if the colors of your cards and dots are different.

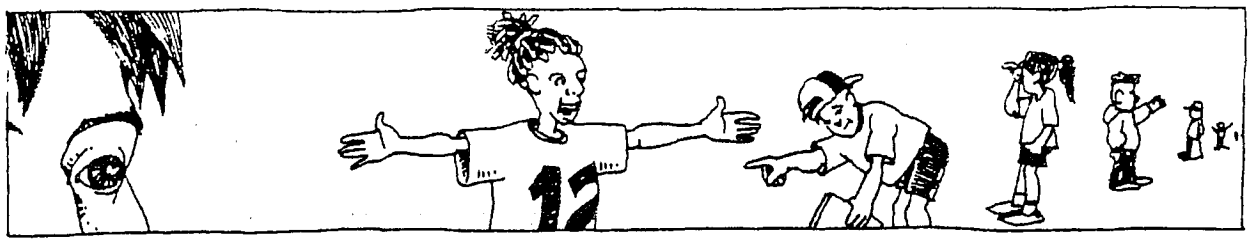
4) Repeat this process for each rule on the resource page. You might have students who do rule (c) stay in position while others graph rule (d), to introduce the idea of the intersection of lines.

   If you want to extend the exercise, have a set of students take two steps to their right after they have created a graph of a function. Ask them what features of the graph change and what features stay the same. This begins an intuitive introduction to translations that will appear occasionally during the year.

5) Back in class: Record data on one large graph using poster graph paper and sticky dots. Have teams of students record their (x, y) coordinates in tables for each rule on the chalkboard, or ask for verbal responses for each separate graph and record the data yourself.

6) Lead a discussion after students complete BC-1 (f) and (g) or have students complete these questions on the back of their data sheets in their study teams.

If the outdoor activity cannot be done due to weather, one alternative is to do the activity as described using the floor of your classroom. Another method is to use large poster graph paper, but this should be avoided if at all possible. Doing this problem outside makes this one of the most memorable and enjoyable problems of the year.



****** Resource Page Provided**

BC-1. ALGEBRA WALK*

The Algebra Walk is an exercise in "human graphing" where people represent points on a graph. Your teacher will give the class instructions on how to form human graphs. Then you will work in study teams to complete the problems below.

For each of the following rules, copy and complete the table. Then neatly graph each point. Use the resource page provided by your teacher.

The x-values in the table are sometimes referred to as **input** values, since they are the values used with the rule for x. The y-values are the **output** values, since they are the result of what happens to the input (x) value.

IN (x)	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
OUT (y)													

a) $y = 2x + 1$

b) $y = -2x$

c) $y = x + 4$

d) $y = -x + 4$

e) $y = x^2$

f) Compare the graphs in parts (a) through (e). How are they similar? How are they different?

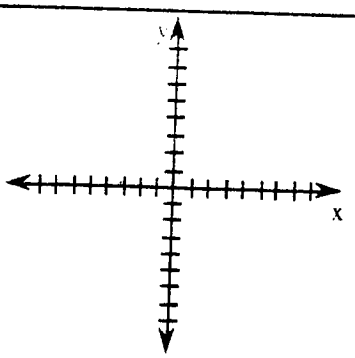
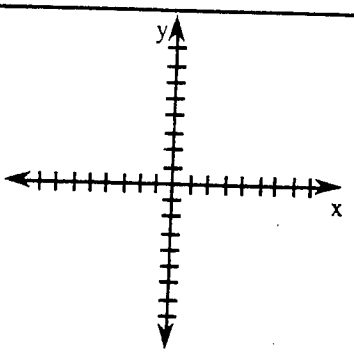
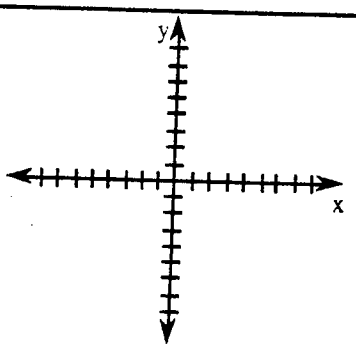
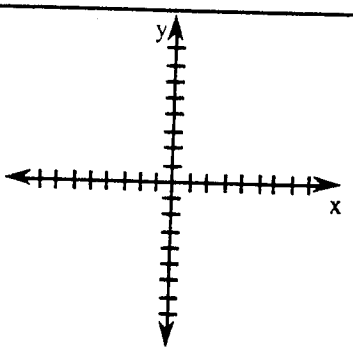
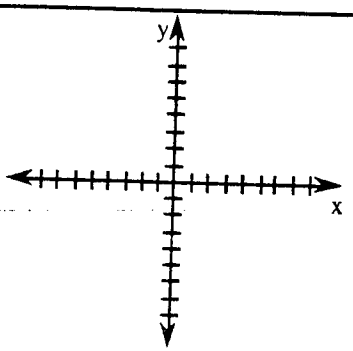
g) Express each symbolic rule in parts (a) through (e) in words.

Solutions:

IN(x)	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	x
a)	**-11**	**-9**	**-7**	**-5**	**-3**	**-1**	**1**	**3**	**5**	**7**	**9**	**11**	**13**	**2x + 1**
b)	**12**	**10**	**8**	**6**	**4**	**2**	**0**	**-2**	**-4**	**-6**	**-8**	**-10**	**-12**	**-2x**
c)	**-2**	**-1**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**x + 4**
d)	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**-1**	**-2**	**-x + 4**
e)	**36**	**25**	**16**	**9**	**4**	**1**	**0**	**1**	**4**	**9**	**16**	**25**	**36**	x^2

* Adapted from the MCTP Professional Development package, written by Australian mathematics teachers

BC-1 Resource Page Algebra Walk Name _____

RED $y = 2x + 1$ IN# → OUT# Multiply your number by two and add one.		Describe what you see:
BLUE $y = -2x$ IN# → OUT# Multiply your number by negative two.		Describe what you see:
YELLOW $y = x + 4$ IN# → OUT# Add four to your number.		Describe what you see:
GREEN $y = -x + 4$ IN# → OUT# Change the sign of your number and add four.		Describe what you see:
ORANGE $y = x^2$ IN# → OUT# Square your number. That is, multiply your number by itself.		Describe what you see: