Name Date

Sort Them

This problem gives you the chance to

- ***sort among verbal, tabular, graphical, and algebraic representations of functions or relations***

Ten different functions or relations are given below, and each function or relation is presented in four ways:

- a graph
- a formula
- a table
- words

Each set of cards on the following pages is grouped incorrectly. It is your job to sort the cards into equivalent sets.

First, cut out all of the cards. Then, working with your partner, decide how they should be sorted. Finally, working on your own, glue or tape the equivalent sets on two sheets of paper.

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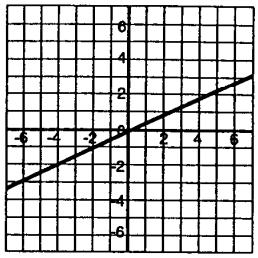
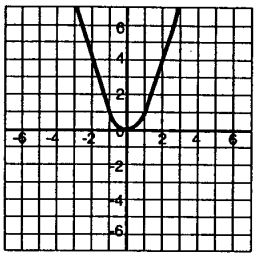
Name Date



$y = x^2$

x	−2	−1	0	1	2	3
y	−4	−3	−2	−1	0	1

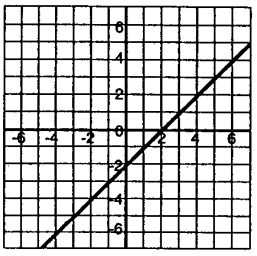
y is one half the size of *x*



$y^2 = x$

x	−2	−1	0	1	2	3
y	−1	−0.5	0	0.5	1	1.5

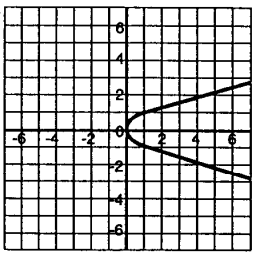
y is 2 more than *x*



$2y = x$

x	0	1	4	9	16
y	0	±1	±2	±3	±4

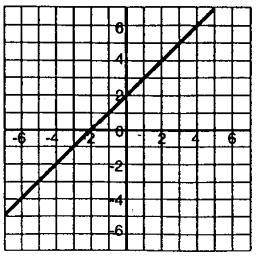
y is 2 less than *x*



$y = x - 2$

x	−2	−1	0	1	2	3
y	4	1	0	1	4	9

y is always 2



$y = 2x$

x	−2	−1	0	1	2	3
y	4	3	2	1	0	−1

x added to *y* is equal to 2

Sort Them

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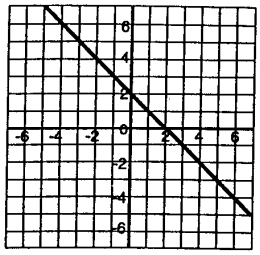
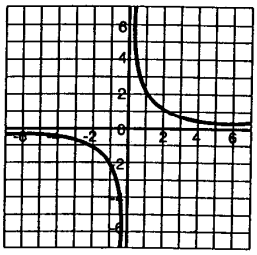


$y = x + 2$

x	−2	−1	0	1	2	3
y	−4	−2	0	2	4	6

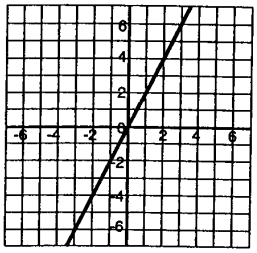
x is y multiplied by y



$x + y = 2$

x	−2	−1	0	1	2	3
y	0	1	2	3	4	5

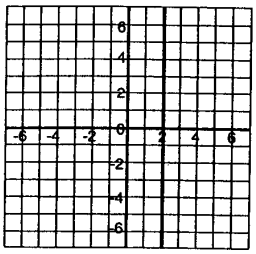
y is double the size of x



$xy = 2$

x	−2	−1	0	1	2	4
y	−1	−2	$\pm\infty$	2	1	0.5

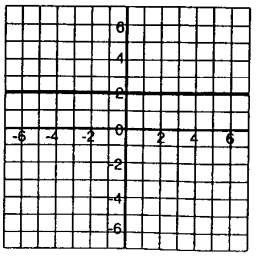
x is always 2



$y = 2$

x	2	2	2	2	2	2
y	−2	0	2	4	6	8

x multiplied by y is equal to 2



$x = 2$

x	−2	−1	0	1	2	3
y	2	2	2	2	2	2

y is the same as x multiplied by x

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Using this Task

Task 3

For Formal Assessment

Organize the class into groups of two and give each student a copy of the task. Read through the task with the whole class to make sure each member understands the problem. Draw students' attention to the first set of four cards. Ask students to look at the first graph, then ask if this can this be expressed by the formula $\boxed{y = x^2}$. The answer should be no.

Then consider the other two cards in the same way. With the class, check to see if the table represents the graph or the formula. Do the same for the verbal statement. Eventually the class should realize that the verbal statement matches the graph but no other card in the first set. Tell students that it is their job to examine all cards in this way and find ten sets of four matching cards. The ten sets are to be glued or taped onto paper. Once the task is explained, be sure that students have scissors to cut out the cards.

Allocate three fourths of the time available to pair consultation. In the remaining time, students should work individually to present their own organized sets. Remind students that they may need to change their minds about what goes where, and they should not paste their solutions too quickly.

Extensions

If students finish the task early, ask them to make up six (the number can vary according to the time available) similar sets of equivalent expressions.

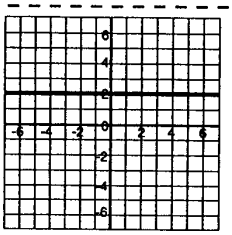
They must follow these constraints:

- two sets must be easy.
- two sets must be of slightly difficult.
- two sets must be extremely hard.

Each set should be labeled with its appropriate difficulty level.

A Sample Solution

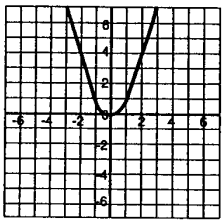
Task 3



$y = 2$

x	−2	−1	0	1	2	3
y	2	2	2	2	2	2

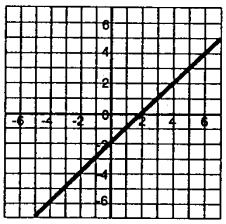
y is always 2



$y = x^2$

x	−2	−1	0	1	2	3
y	4	1	0	1	4	9

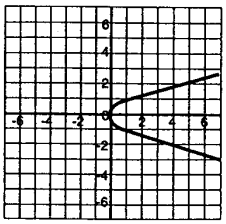
y is the same as x multiplied by x



$y = x - 2$

x	−2	−1	0	1	2	3
y	−4	−3	−2	−1	0	1

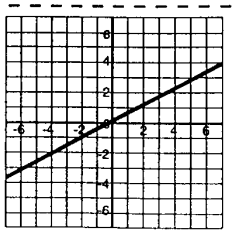
y is 2 less than x



$y^2 = x$

x	0	1	4	9	16
y	0	±1	±2	±3	±4

x is y multiplied by y



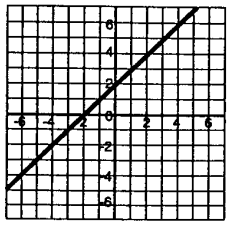
$2y = x$

x	−2	−1	0	1	2	3
y	−1	−0.5	0	0.5	1	1.5

y is one half the size of x

Task

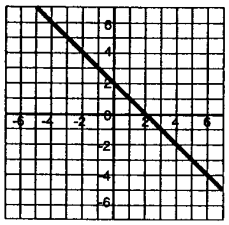
3



$y = x + 2$

x	−2	−1	0	1	2	3
y	0	1	2	3	4	5

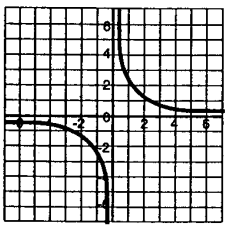
y is 2 more than x



$x + y = 2$

x	−2	−1	0	1	2	3
y	4	3	2	1	0	−1

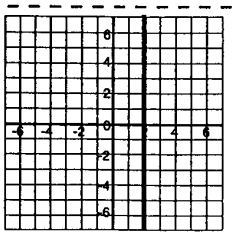
x added to y is equal to 2



$xy = 2$

x	−2	−1	0	1	2	4
y	−1	−2	±∞	2	1	0.5

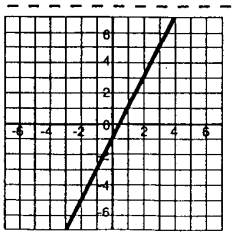
x multiplied by y is equal to 2



$x = 2$

x	2	2	2	2	2	2
y	−2	0	2	4	6	8

x is always 2



$y = 2x$

x	−2	−1	0	1	2	3
y	−4	−2	0	2	4	6

y is double the size of x