

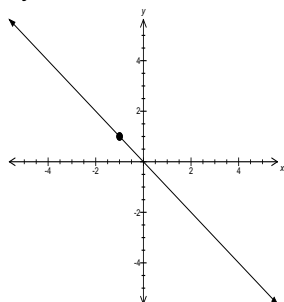
# FU1.4: HYBRID FUNCTIONS

## Functions with a restricted domain

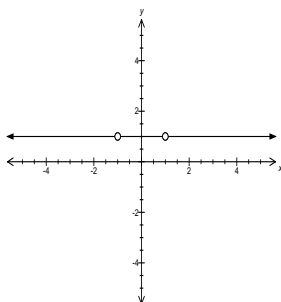
Functions which have different rules for each subset of the domain are called *hybrid functions*. Sometimes they are referred to as *piecewise defined functions*.

Consider the following functions and their graphs noting the restricted domains:

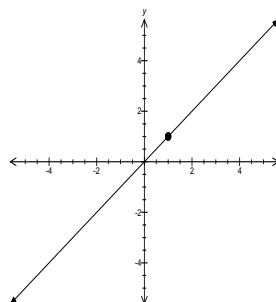
$$y = -x, x \leq -1$$



$$y = 1, -1 < x < 1$$



$$y = x, x \geq 1$$

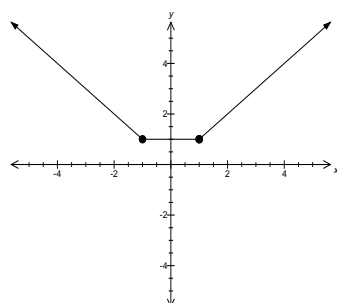


## Functions defined in pieces

These 'pieces' can be put together to form the hybrid function

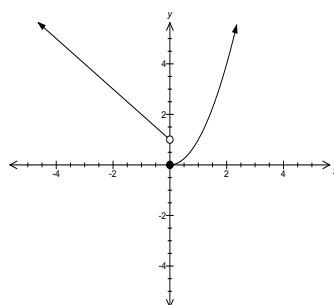
$$y = f(x) = \begin{cases} -x, & x \leq -1 \\ 1, & -1 < x < 1 \\ x, & x \geq 1 \end{cases}$$

and its graph



## Example

Draw a sketch graph of  $y = f(x) = \begin{cases} 1 - x, & x < 0 \\ x^2, & x \geq 0 \end{cases}$



## Exercise

Draw a sketch graph of

1.  $f(x) = \begin{cases} x+1, & x < 0 \\ x-1, & x \geq 0 \end{cases}$

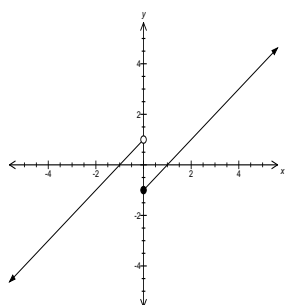
2.  $f(x) = \begin{cases} x^2, & x < 0 \\ -x^2, & x > 0 \end{cases}$

3.  $f(x) = \begin{cases} -1, & x < -2 \\ 0, & -2 \leq x \leq 2 \\ 1, & x > 2 \end{cases}$

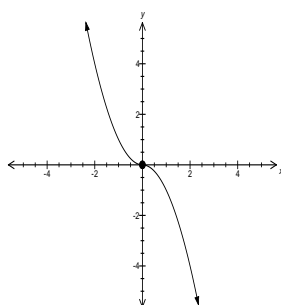
4.  $f(x) = \begin{cases} x+2, & x < -1 \\ 1, & -1 \leq x \leq 1 \\ x, & x > 1 \end{cases}$

## Answers

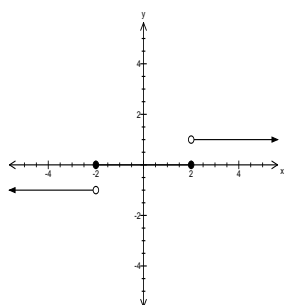
1.



2.



3.



4.

