Lesson 5.1: Graphical Features

Function: Each input has exactly one output (vertical line test)

Domain: all the inputs (x-values).
Range: all the outputes (y-values).

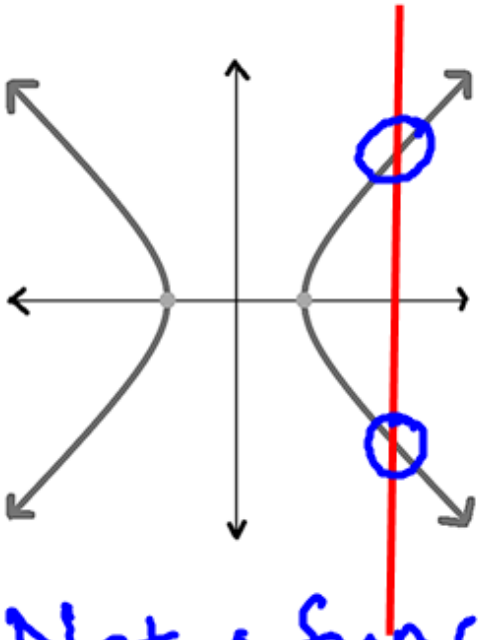
Increasing: the interval(s) where the y-values are increasing.
Decreasing: the interval(s) where the y-values are decreasing.
Constant: the interval(s) where the y-values are constant.

x-intercept: the point(s) where the graph crosses the x-axis
y-intercept: the point where the graph crosses the y-axis.

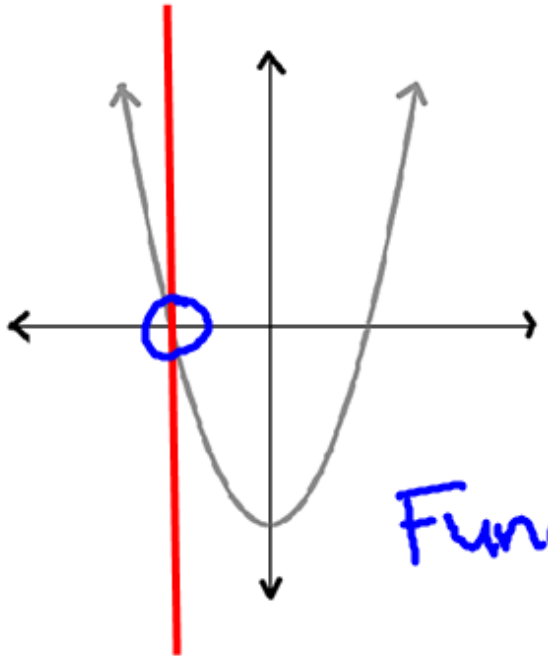
End Behavior: the behavior of the y-values as x approaches negative infinity and positive infinity.

Maxima: the point where the graph switches between increasing and decreasing (peak).
Minima: the point where the graph switches between decreasing and increasing (valley).

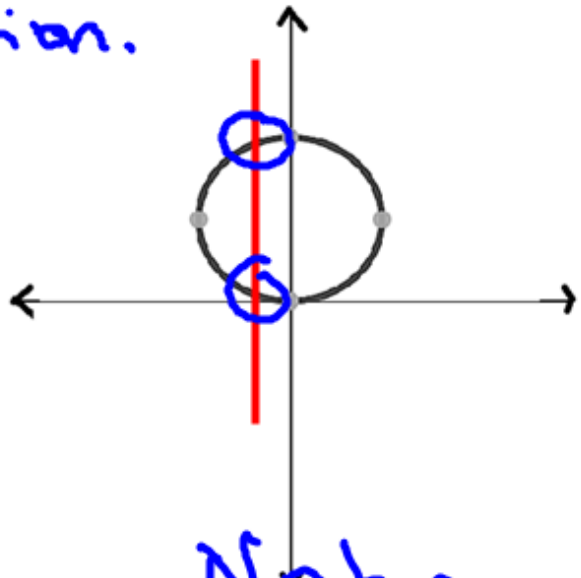
Identify if the following are functions or not:



Not a function.



Function

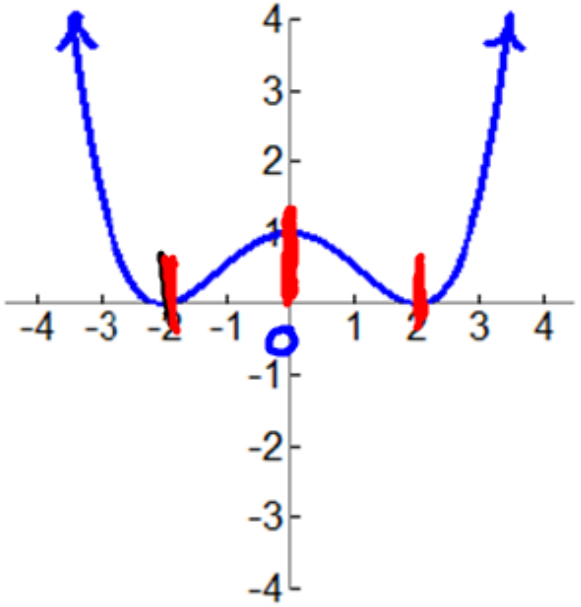


Not a function

Find the following:

a) Domain and range

b) The intervals for which the function is increasing, decreasing, and constant.



a) Domain:

All Real Numbers

$\mathbb{R}$

Range: $\boxed{y \geq 0}$

$[0, \infty)$

included

not include

b) Increasing: $-2 < x < 0$ or $(-2, 0)$

$x > 2$ or $(2, \infty)$

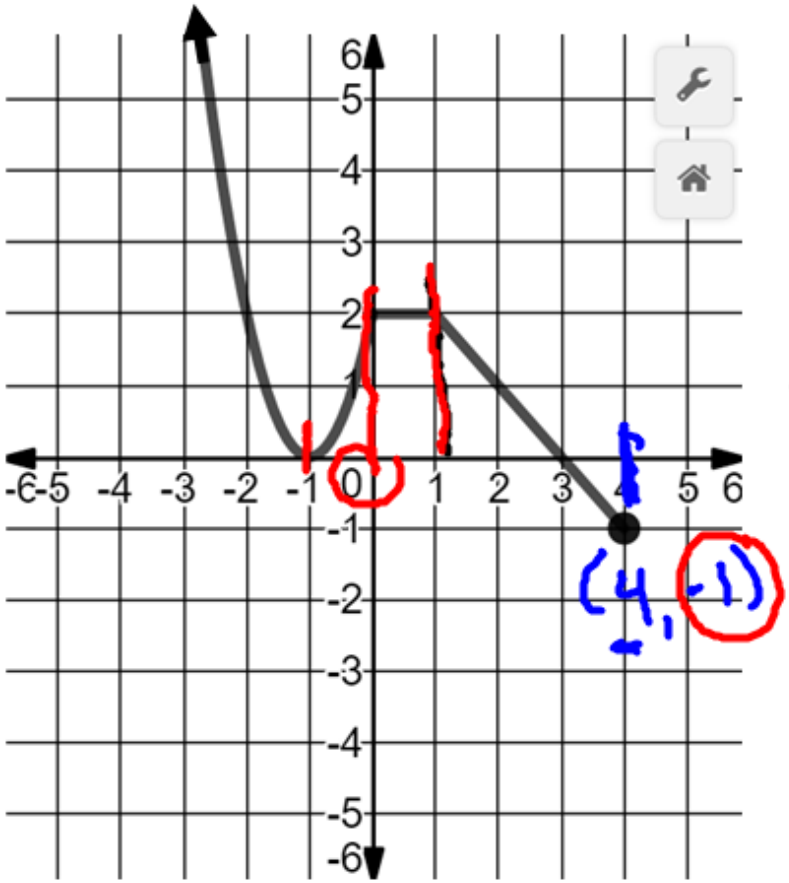
Decreasing: $x < -2$ or $(-\infty, -2)$

$0 < x < 2$ or $(0, 2)$

Find the following:

a) Domain and range

b) The intervals for which the function is increasing, decreasing, and constant.



a) Domain:

$x \leq 4$ or $(-\infty, 4]$

Range:

$y \geq -1$ or $[-1, \infty)$

b) Increasing:

$-1 < x < 0$ or $(-1, 0)$

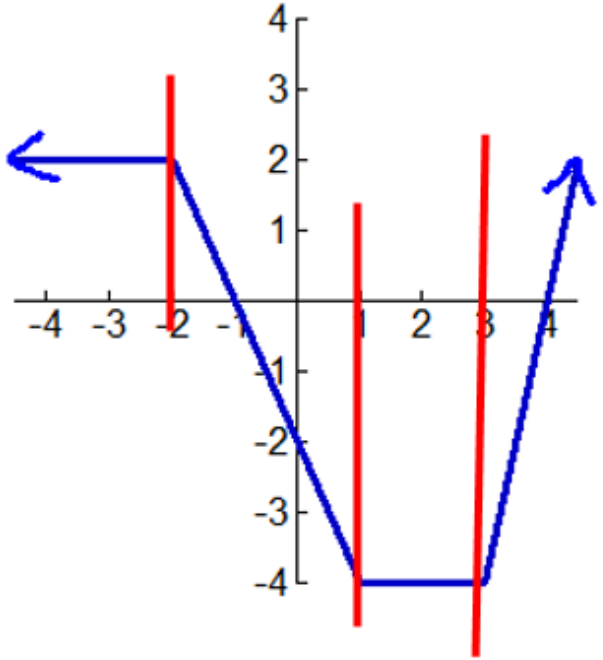
Decreasing:

$x < -1$ or $(-\infty, -1)$

$1 < x < 4$ $(1, 4)$

Constant:

$0 < x < 1$ or $(0, 1)$



D: $\mathbb{R}$ $(-\infty, \infty)$

R: $y \geq -4$

$[-4, \infty)$

Inc: $(3, \infty)$ $x > 3$

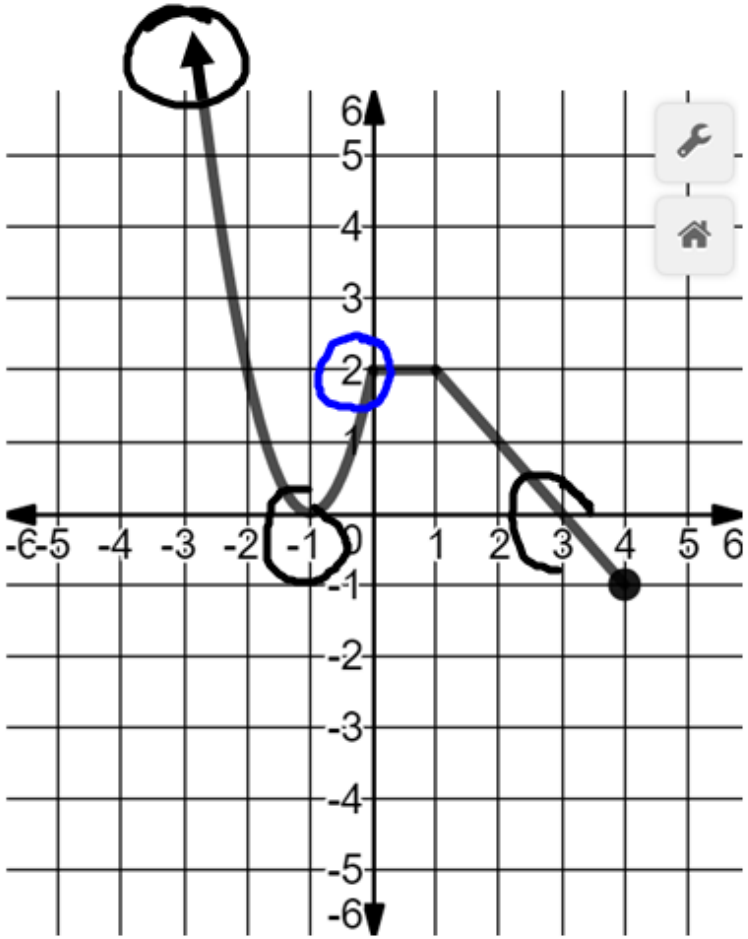
Dec: $(-2, 1)$ $-2 < x < 1$

Con: $(-\infty, -2)$ $x < -2$

$(1, 3)$ $1 < x < 3$

For the following find the following:

a) The Intercepts
b) End Behavior
c) Local Maxima and Minima



a) x-int: $(-1, 0)$ $(3, 0)$
y-int: $(0, 2)$

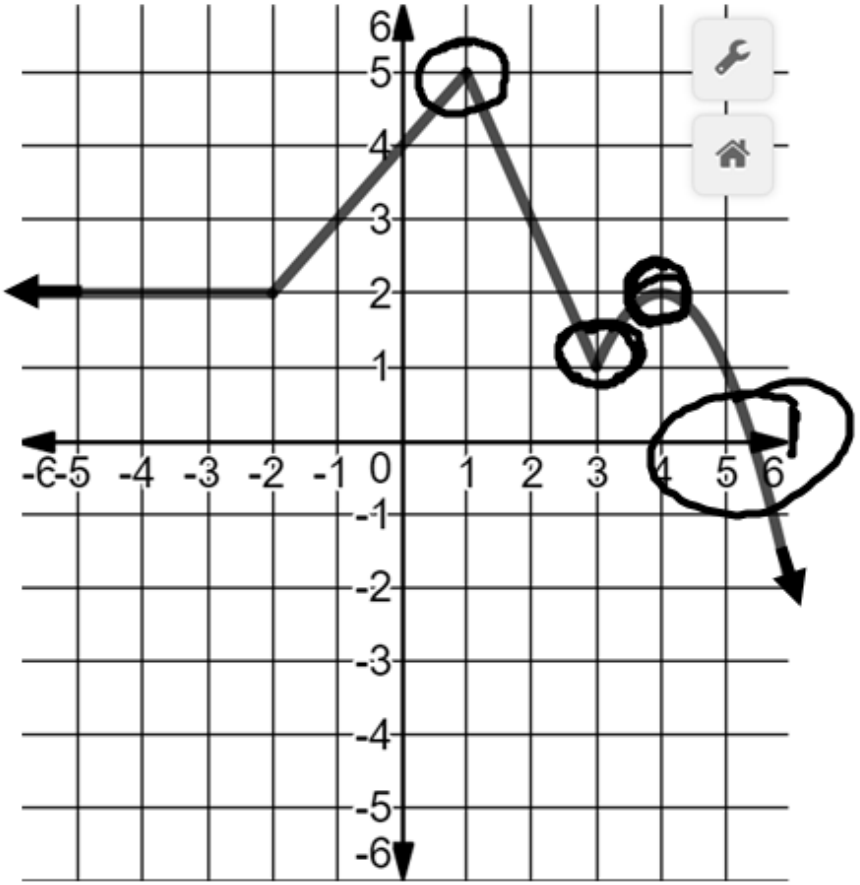
b) As $x \to -\infty$, $y \to \infty$
(Left)

L ↑

c) Min: $(-1, 0)$
x y

For the following find the following:

a) The Intercepts
b) End Behavior
c) Local Maxima and Minima



a) x-int: (5.5, 0)
y-int: (0, 4)

b) L → 2
R ↓

c) Max: (1, 5)
(4, 2)

Min: (3, 1)