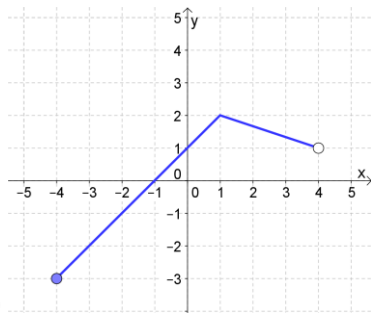


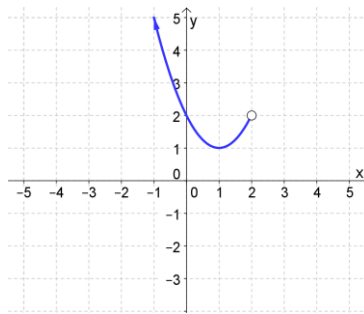
1. Use the graph of each function to find its domain and range.



a)

$$\text{Domain: } [-4, 4)$$

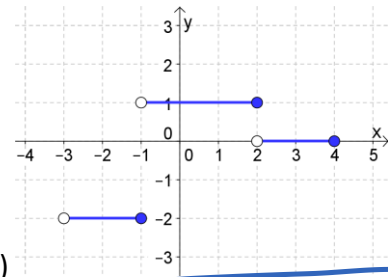
$$\text{Range: } [-3, 2]$$



b)

$$\text{Domain: } (-\infty, 2)$$

$$\text{Range: } [1, \infty)$$

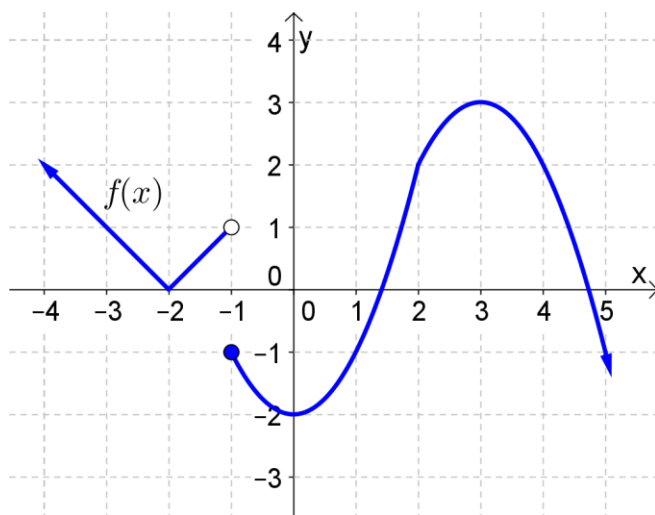


c)

$$\text{Domain: } (-3, 4]$$

$$\text{Range: } \{-2, 0, 1\}$$

2.



a) Determine the intervals on which $f(x)$ is increasing, decreasing, and constant.

$$\text{Increasing: } [-2, -1), [0, 3]$$

$$\text{Decreasing: } (-\infty, -2], [-1, 0], [3, \infty)$$

b) Find all local maxima and minima (write answers in the form $f(123) = 456$).

$$\text{Local max } f(3) = 3$$

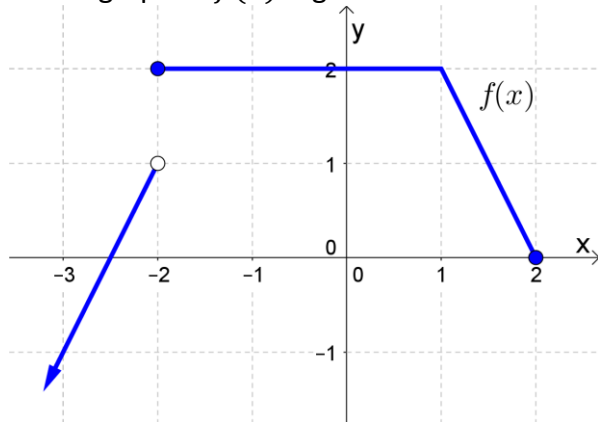
$$\text{Local min } f(-2) = 0$$

$$\text{Local min } f(0) = -2$$

c) Find the values of x for which $f(x) = 2$.

$$x = -4, 2, 4$$

3. The graph of $f(x)$ is given below.



a) Determine the intervals on which $f(x)$ is increasing, decreasing, and constant.

Increasing: $(-\infty, -2]$

Decreasing: $[1, 2]$

Constant: $[-2, 1]$

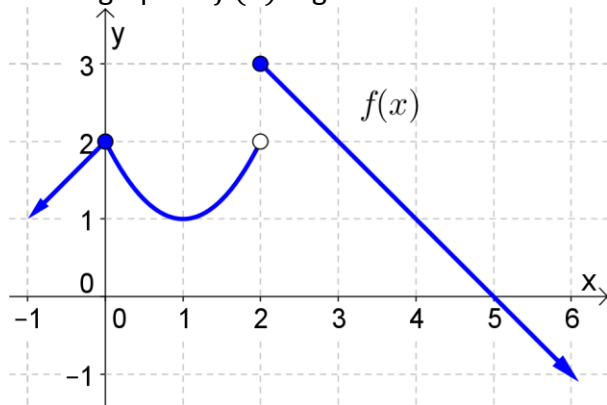
b) Find the domain of $f(x)$.

$(-\infty, 2]$

c) Find the range of $f(x)$.

$(-\infty, 2]$

4. The graph of $f(x)$ is given below.



a) Determine the intervals on which $f(x)$ is increasing and decreasing.

Increasing: $(-\infty, 0]$, $[1, 2]$

Decreasing: $[0, 1]$, $[2, \infty)$

b) Find all local maxima and minima.

Local max: $f(0) = 2$ and $f(2) = 3$

Local min: $f(1) = 1$

c) Find the value(s) of x for which $f(x) = 1$.

$x = -1, 1, 4$

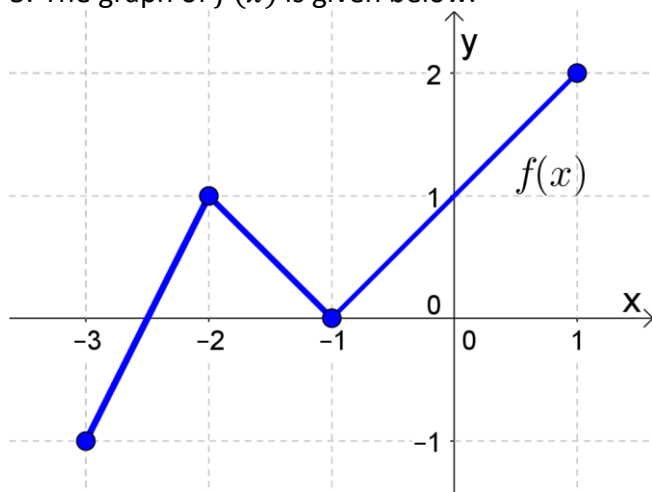
d) Find the domain of $f(x)$.

$(-\infty, \infty)$ (or \mathbb{R})

e) Find the range of $f(x)$.

$(-\infty, 3]$

5. The graph of $f(x)$ is given below.



a) Determine the intervals on which $f(x)$ is increasing and decreasing.

Increasing: $[-3, -2]$, $[-1, 1]$

Decreasing: $[-2, -1]$

b) Find all local maxima and minima.

Local max: $f(-2) = 1$ and $f(1) = 2$

Local min: $f(-1) = 0$ and $f(-3) = -1$

← Note: Some books don't consider endpoints to be local maxes or mins. But here I am.

c) The **absolute maximum** is the largest function value in the domain of the function (if any).
The **absolute minimum** is the smallest function value in the domain of the function (if any).
Find the absolute maximum and absolute minimum of $f(x)$, if any.

Absolute max: $f(1) = 2$

Absolute min: $f(-3) = -1$

d) Find the value(s) of x for which $f(x) = 1$.

$x = -2, 0$

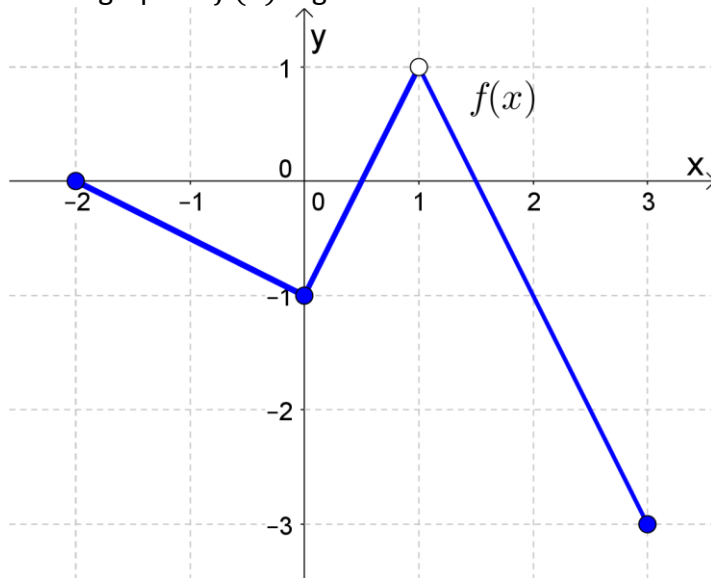
e) Find the domain of $f(x)$.

$[-3, 1]$

f) Find the range of $f(x)$.

$[-1, 2]$

6. The graph of $f(x)$ is given below.



a) Determine the intervals on which $f(x)$ is increasing and decreasing.

Increasing: $[0, 1)$

Decreasing: $[-2, 0], (1, 3]$

b) Find all local maxima and minima.

Local max: $f(-2) = 0$

Local min: $f(0) = -1$ and $f(3) = -3$

c) Find the absolute maximum and absolute minimum of $f(x)$, if any.

Absolute max: none

Absolute min: $f(3) = -3$

d) Find the value(s) of x for which $f(x) = -1$.

$x = 0, 2$

e) Find the domain of $f(x)$.

$[-2, 1) \cup (1, 3]$

f) Find the range of $f(x)$.

$[-3, 1)$