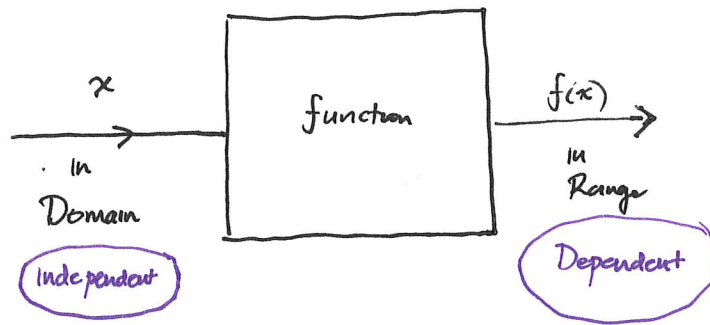


FUNCTIONS (1.1)

A function is a rule that takes as input certain numbers from a set called the DOMAIN and assigns to each a definite value in the range



EXAMPLES

(i) COST FUNCTION

$C(q)$ - The total cost of producing a quantity q of some goods

(ii) REVENUE FUNCTION

$R(q)$ - The total revenue received by a company from selling a quantity q of goods

(iii) PROFIT

$$P(q) = R(q) - C(q)$$

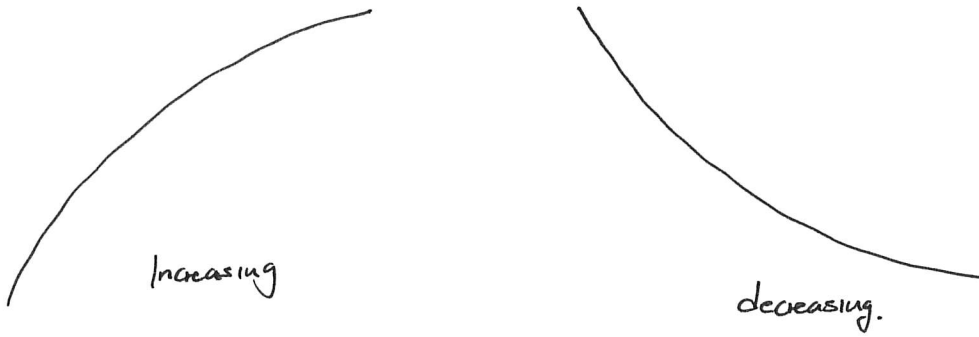
The total profit from selling q goods.

In Examples (i) - (iii), the input / independent variable is the quantity q and the output is $C(q)$, $R(q)$, $P(q)$ in dollars.

(iv) Variation of temperature with time on a given day

Domain is t in hours and Range is temperature in $^{\circ}\text{C}$. ($T(t)$)

1.1 Increasing and decreasing functions



Example

The concentration of CO_2 in the atmosphere in ppm is a function of years, t , since 1960

(a) Interpret $f(40) = 370$ in terms of CO_2

(b) What is the meaning of $f(50)$?

Solutions

(a) In 2000, the concentration of CO_2 is 370 parts per million

(b) $f(50)$ is the concentration of CO_2 in ppm in 2010.

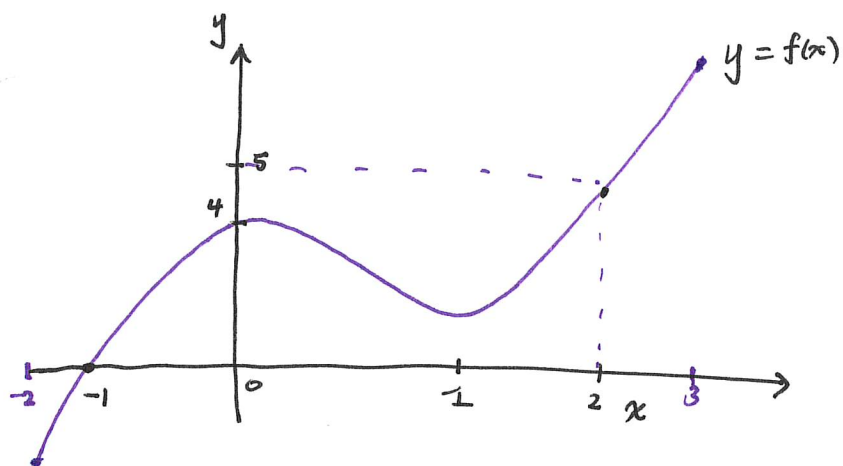
Example

The chirp rate of crickets is a function of temperature

$$C = f(T) = 4T - 160$$

(a) Graph the cricket chirp rate

(b) solve $f(T) = 0$ and interpret the result

More on graphs

(i) $f(2) = 5$

(ii) Horizontal intercept at $x = -1$ (iii) Vertical intercept at $y = 4$.(iv) The function is increasing for $-2 \leq x \leq 0$ & $1 \leq x \leq 3$ (iv) f is decreasing on $0 \leq x \leq 1$.In general① A function is increasing if values of $f(x)$ increase as x increases.② A function is decreasing if values of $f(x)$ increase as x decreases.EXAMPLE

Let $W = f(t)$ represent wheat production in Argentina in millions of metric tons when t is time in years since 2006.

(a) What does $f(4) = 14$ mean?

$$t = 4 \Rightarrow 4 \text{ years after } 2006 \Rightarrow 2010.$$

In 2010, the wheat production is 14 million tonnes.

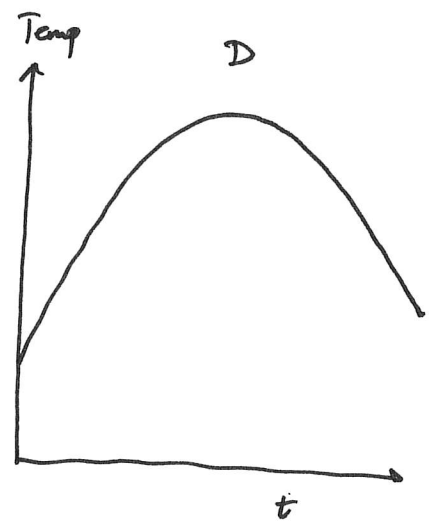
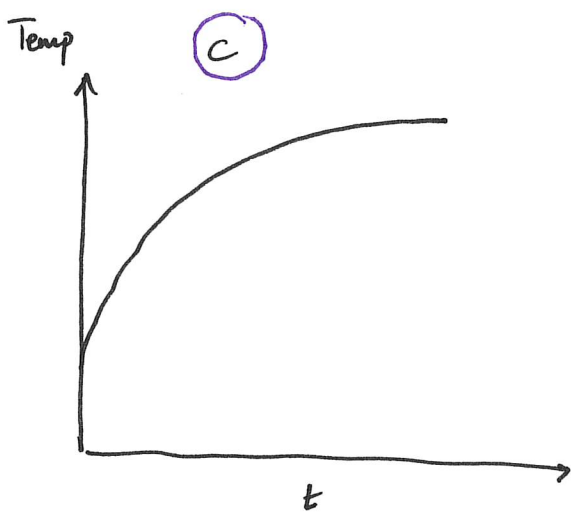
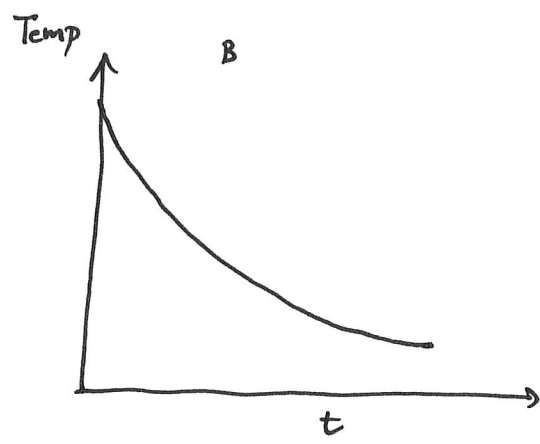
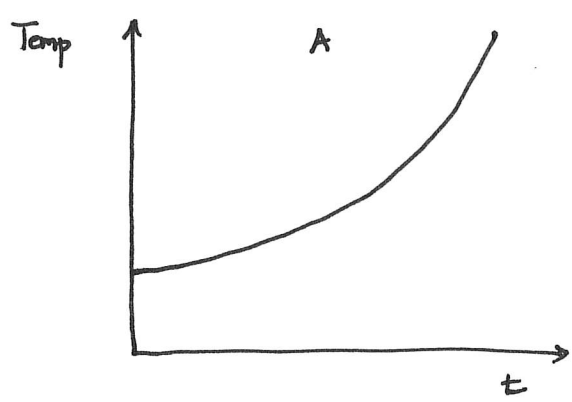
(b) Suppose

$$f(t) = 2t + 6$$

Find and interpret $f(5)$.

$$f(5) = 16 \Rightarrow \text{In } 2011, \text{ the wheat production is } 16 \text{ million tonnes.}$$

(iv) A potato is placed in an oven at 350°F to bake at t=0.
Which graphs could represent the temperature as a function of t.



The oven is at a fixed temp so
the temp of the potato will increase
to a maximum.

THEY DO

Example #1 (Section 1.1).

Section 1.1 #25.

Summary

- Functions - Domain, Range
- Graphical Representation, Table Representation, Interpretation