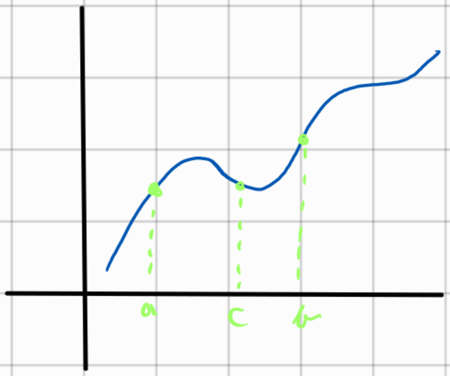
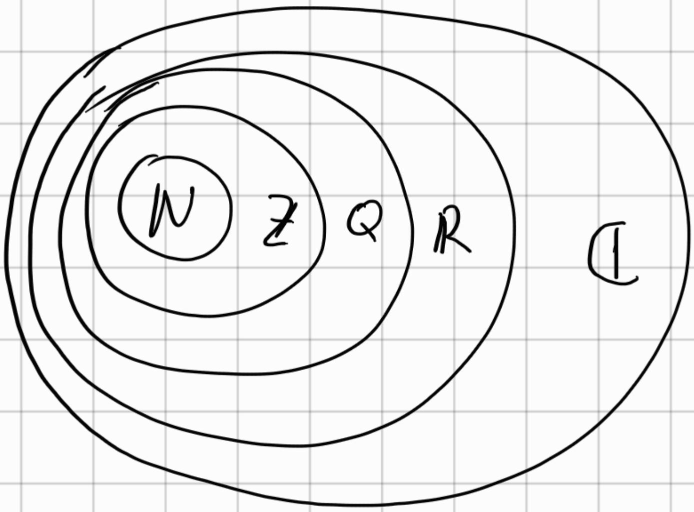
Mean value theorem:





Significant figures:

$\pi = 3.14159$ (5 dp, 6 sf) ← significant figures

decimal places

$\alpha = 0.007\ 257\ 352\ 57$ (11 dp, 9 sf)

$+ m = 10^{e}$ ← exponent

mantissa

$1 \leq m \leq 10$

? How do we represent num. in computer ?

- 0s and 1s

→ single precision 32 bit FP
→ double precision 64 bit FP

$$\overset{\text{1 bit}}{\pm}\ \underbrace{1.XXX\dots X}_{\substack{1+52\text{ bit}\\ \text{mantissa}}} \cdot 2^{\overbrace{\pm XXX\dots X}^{1+10\text{ bit exponent}}}$$

$$-6.75 = -1.6875 \cdot 2^2$$
$$= -1.(XXX\dots X)_2 \cdot 2^{(0000000010)_2}$$

Problem:

1 + 7 bit mantissa
1 + 3 bit exponent

$$3 = +1.5 \cdot 2^{+1} = +1,(0000101)_2 \cdot 2^{+(001)_2}$$

$$1 = +1,(0000\,000)_2 \cdot 2^{+(000)_2}$$

$$1/3 = 0.333\bar{3}$$
$$\simeq +1.333\bar{3} \cdot 2^{-2}$$
$$= +1.(0101010|\cancel{1\dots})_2 \cdot 2^{(010)_2}$$

Round off error