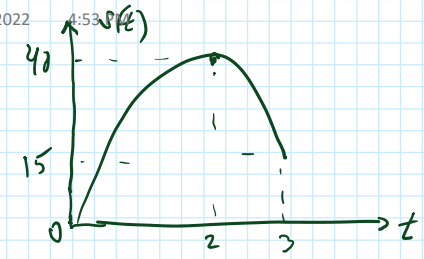
# R08 Model solution (Maxima & minima)

Tuesday, October 11, 2022 4:53 PM

4.1.71.




$s: [0,3] \to \mathbb{R}$ object position

$s(t) = 32t - t^4 = t(32 - t^3)$

"When is object farthest to right?"

becomes

"when does $s(t)$ reach its maximum"

$s: [0,3] \to \mathbb{R}$ ; $s$ continuous, $s$ could reach maximum at endpoints $t=0$ & $t=3$ or could reach maximum when $s'(c)=0$

$s'(t) = 32 - 4t^3 \Rightarrow s'(c) = 0 \Rightarrow 32 - 4c^3 = 0 \Rightarrow c^3 = \frac{32}{4} = 8 \Rightarrow c = 2$

$a = 0 \le c \le 3 = b$

| $t$ | 0 | | 2 | | 3 |
|---|---|---|---|---|---|
| $s(t)$ | 0 | | 48 | | 15 |
| $s'(t)$ | + | + + | 0 | − | − − |

Maximum is reached at $t=2$

Minimum is reached at $t=0$

"Maximum" or "Global maximum" or "Absolute maximum" (textbook)