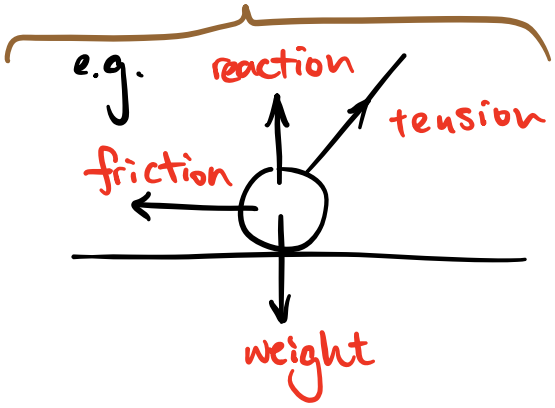
Mechanics

Forces

- Tension
- Friction
- Weight
- Normal reaction

Force / Free body diagrams

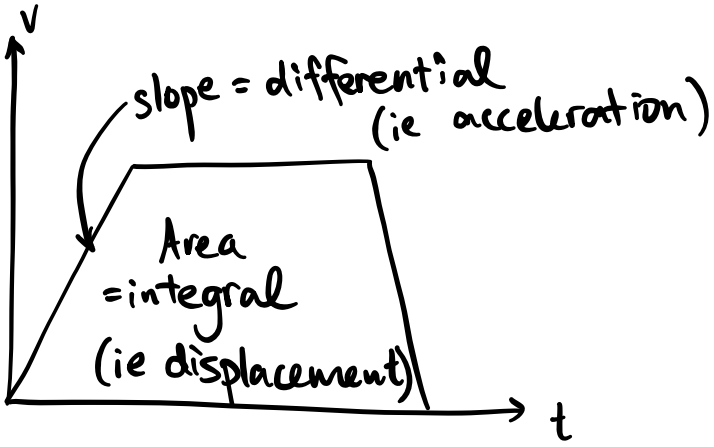


The key: $F = ma$

force causes acceleration!

Motion

- Displacement / position
- Velocity / speed
- Acceleration



EX 8A

1 $h = 0.36x - 0.003x^2$

(a)(i) when $x=0$, $h=0$ $\therefore$ 0m

(ii) when $x=100$, $h = 36 - 30 = 6$ $\therefore$ 6m

(b) When $x=200$, $h = 72 - 120 = -48$m

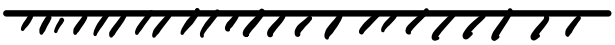
(c) When x is large, model predicts height to be negative

Definitions

"Particle": Dimensions are negligible

Mass concentrated at 1 point

"Rough/Smooth Surface": Objects do/do not experience friction

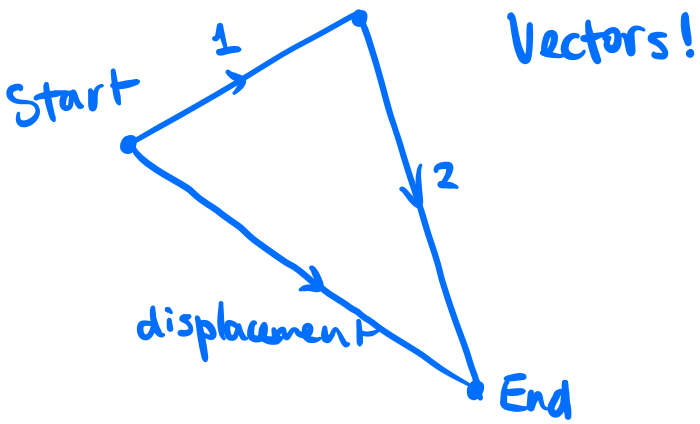


"Smooth pulley": Pulley has no friction

"inextensible string": String with fixed length
No elasticity

Vectors & Scalars

Vector	Scalar
Displacement	Distance
Velocity	Speed
Acceleration	/
Force	/
/	Time
/	Mass



Ex 8A

2. a) $t = 0 \rightarrow h = 90\text{ m}$

b) i) $t = 3 \rightarrow h = -5(3)^2 + 15(3) + 90 = 90\text{ m}$

ii) $t = 5 \rightarrow h = -5(5)^2 + 15(5) + 90 = 40\text{ m}$

c) $t = 20 \rightarrow -5(20)^2 + 15(20) + 90 = -1610\text{ m}$

d) the stone falls a lot slower underwater. And the bottom of the ocean may not be that deep.