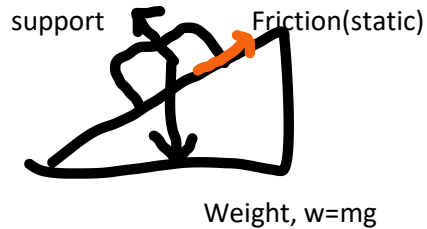# Free body force diagram

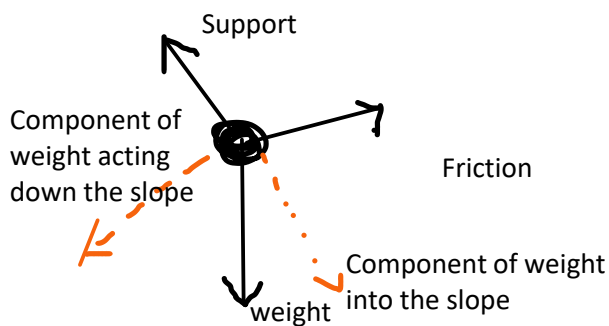Friday, 1 March 2024   9:32 am

- Arrow direction of force
- Length - size of force
- Weight force - from the center of mass
- Only draw the force acting on the object (not the force that acting back)

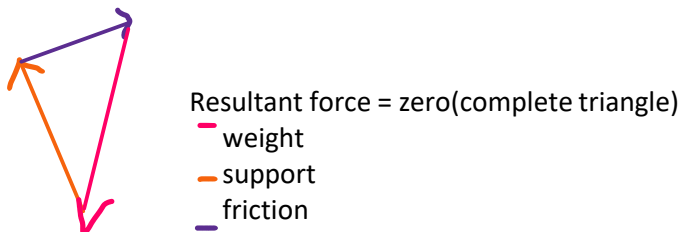Example #1 incline plane

All force are balanced

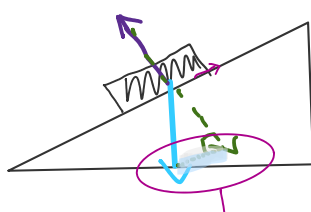support   Friction(static)

Net force = 0

Weight, w=mg

Support

Component of
weight acting
down the slope

Friction

Component of weight
into the slope

weight

Component of weight down slope = friction
Component of weight into slope = support

Vector diagram

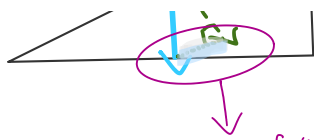Resultant force = zero(complete triangle)
— weight
— support
— friction

Example #2
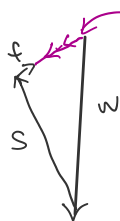
accelerating down a slope with friction

— friction
— weight
— support

support force balanced

support force balanced
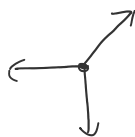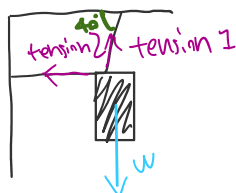
force let the object slipe down slope

vector diagram

resultant force
※ tail of first force
to head of last force

once get the resultant force
we can use $F = ma$ to calculate
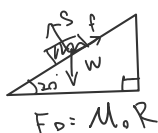the acceleration

Example #3 transactional equilibrium

transactional equilibrium
– all force are balanced.

tension2 / tension 1

W

can calculate
T1 and T2
use trig

Question!
Inclined plane example
A 3kg block is moving at constant speed on a slope calculate μ_0

$F_D = \mu_0 R$

angle in vector is according to angle of force in diagram
normally the question will give 1 angle information.
So we can decide the right angle to find all
the angle in vector diagram.