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AS-MATHEMATICS FORMULA SHEET MECHANICS (M1)

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Forces and Equilibrium:

I $F=\mu R$
F = force (N)
μ= coefficient of friction
R= normal reaction

Kinematics:

I $V = s/t$
I $V^2=u^2 + 2as$
I $S =½ (u + v) t$
I $S = ut + ½ at^2$
I $S = vt - ½ at^2$
I $V = u + at$
V = final velocity (ms^{-1})
U = initial velocity (ms^{-1})
S = displacement (m)
T = time (s)
A = acceleration (ms^{-2})

I GRADIENT: Y_2-Y_1 / X_2-X_1
Gradient of velocity-time graph= Acceleration
Gradient of displacement-time graph = Velocity
Area of velocity-time graph = displacement

Newton's Law of Motion:

I F= m x a
F = force (N)
M = mass (kg)
A = acceleration (ms^{-2})
I $F = \Delta P/t$
F = force (N)
ΔP = change in momentum (Ns)
T = time taken (s)

Work, Energy and Power:

I W = F x D
W = work (J)
F = force (N)
D = distance travelled in direction of force (m)
I $P = W / \Delta t$
W = work done (J)
ΔT = time taken (s)
I P = F x v
F = force (N)
V = velocity (ms^{-1})
I $E = mg\Delta h$
M = mass (kg)
G = gravitational field strength ($kgms^{-2}$)
ΔH = change in height (m)

Momentum:

I P = m x v
p= momentum (Ns)
M = mass (kg)
V = velocity (ms^{-1})
I P= F x D
F = force (N)
D = distance perpendicular to force from pivot (m)
I Impulse = m x Δv
M = mass (kg)
Δv = change in velocity (ms^{-1})
I $F_1D_1 = F_2D_2$
Moment of an arm -
F = force (N)
D = distance (m)