Physics Formulae

EK = ½mv2

W = F∙∆d

= ma∙∆d (since F = ma)

= m(vf2 - vi2)∙∆d (since a = vf2 - vi2

2∆d 2∆d)

= m(vf2 - vi2)

2

= ½mvf2 - ½mvi2

= EKf - EKi

= ∆EK

W = F∙∆d

W = mg∙∆y

∆Eg = mg∙∆y

ET = EG + EK

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

FX = -kx or FX = kx

W = ½F∙x

Ee = ½kx2 (since W=Ee and F = kx)

aC = 4π2r

T2

T2 = 4π2r

aC

T = 2π√r

√aC

T = 2π√A (since r = A for the reference circle)

√aC

-kx = maX (since FX = -kx and FX = maX)

aX = k

-x m

T = 2π√A

√aC

= 2π√-x (since A/aC = -x/aX)

√aX

= 2π√m (since -x/aX = m/k)

√k

f = 1 (√k) (since f = 1/T)

2π(√m)

Ee = ½kA2

ET = ½kx2 + ½mv2 (and sometimes - GMm/r2)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

P = mv

I = F∙∆t

∆PTi = ∆PTf

m1∆u1 + m2∆u2 = m1∆v1 + m2∆v2

EKi = EKf

½m1∆u12 + ½m2∆u22 = ½m1∆v12 + ½m2∆v22

∆P1 = -∆P2

m1∆v1 = -m2∆v2

P2 = m2v2 = mv2 = EK

2m 2m 2

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

FG = GMm

r2

g = GM (since FG = mg)

r2

v = √(GM/r)

r3 α T2

r3 = CST2

CS= r3/T2

T = 2πr

v

T = 2πr\_\_ (since v = √(GM/r))

√(GM/r)

T2 = 4π2r2

GM/r

T2 = 4π2r2(r)

GM

T2 = 4π2r3

GM

r3 = GM

T2 4π2

C = r3 = GM

T2 4π2

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

W = √(F1∙F2)(r2-r1)

= √[(GMm/r12)(GMm/r22)](r2-r1)

= GMm(r2-r1)

r1r2

= GMm - GMm

r1 r2

∆Eg = E2 - E1

= GMm - GMm

r1 r2

= - GMm - -GMm

r2 r1

= W

As r2 --> ∞, Eg2 --> 0, so if r2 is outside the gravitational field:

∆Eg = 0 - E1

= 0 - -GMm

r1

ET = EK + Eg = 0

EK = Eg

½mv2 = - -GMm

r2

vesc =√(2GM/r)

EK = Eg

½mv2 = - -GMm

r2

Eesc = GMm

r2

EB = -ET

= - (½mv2 - GMm/r)