**Physics 111 Common Exam 2 Formulas**

**Conversion Factors:** 1 inch = 2.54 cm; 1 mi =1609.3 m; 1 cm=10-2 m; 1 mm= 10-3 m; 1 g=10-3 kg;

**Physical constants:**  m/s2 ;  N m2/kg2 ;  kg ;  m

**Math:** 360° = 2π radians = 1 revolution. Arc length  ;  ;  ; 

quadratic formula to solve  : 

**Vectors: Ax = A cosθ; Aopposite = A sinθ; A =; θ = tan-1; A = Ax î + Ayĵ**

**A + B = C ⇒ Cx = Ax + Bx , Cy = Ay  + By; ;**

**One-dimensional motion**: **x**  **= vavrt ; x = x0 + vot +at2,**  ** ; v = vo + at; ;**

**Free-fall: y =y0 + vo t -gt2, v = vo - gt, ;  **

**Two-dimensional motion: r = r0 + (vox t +ax t2) î + (voy t +ay t2) ĵ v = (vox + ax t) î + (voy + ayt) ĵ;**

**Projectile motion**: **x = voxt ; y = v0yt - gt2; vy = voy - gt; vox = vocosθ; voy = vosinθ; ;**

 **Range =     Circular motion: ac = ; period T = ; Dynamic: Fnet  = ma; Fnetx = max ; Fnety = may; |Fg| = mg, ; g = 9.8 m/s2;**  **Fnet = ;**

**Incline: Fgx(along an incline) = mgsinθ Fgy(perpendicular to an incline) = mgcosθ**

**work: W = F ⋅ d = Fdcosφ; Wmg = mg(y0 - y) , Fspring = -kx ; Wspring = 1/2 k(x02-x2)**

**Wfr = -Fk d; Fk = μkN; Wtot = Kf - Ki ; Pavg =  Kinetic energy: K = v2**

**Ug = mg(y-y0) Us = 1/2 kx2, Ugi + Usi + KI = Ugf + Usf + Kf Ugi + Usi + KI + Wnc = Ugf + Usf + Kf**