*Two body data sheet (SI units only)*

*Plan view ▼*

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*G = 6.674 E-11 a constant*

*M1 = mass, object 1 kg*

*M2 = mass, object 2 kg*

*d = centre to centre distance metres*

*Calculations :*

*r1 = M1 orbital radius = ( M2 / ( M1 + M2 ) ) \* d metres*

*r2 = M2 orbital radius = ( M1 / ( M1 + M2 ) ) \* d metres*

*F = ( G \* M1 \* M2 ) / d ² Newtons*

*g1 = M1 gravitational acceleration = F / M1 ( m / s ) / s*

*g2 = M2 gravitational acceleration = F / M2 ( m / s ) / s*

*v1 = M1 orbital velocity = sqrt ( g1 \* r1 ) ( m / s )*

*v2 = M1 orbital velocity = sqrt ( g2 \* r2 ) ( m / s )*

*t1 = M1 ( sidereal ) orbit time = ( 2 \* π \* r1 ) / v1 ( s )*

*t2 = M2 ( sidereal ) orbit time = ( 2 \* π \* r2 ) / v2 ( s )*

*( t1 and t2 will be the same )*

*NOTES :*

1. *In stable orbit, momentum M1 = momentum M2*

*( M1 \* v1 = M2 \* v2 )*

1. *If M1, M2 and t are known, find d from :*

*d = cube root ( ( t ² \* G \* M2 ) / ( 4 \* π ² \* ( M2 / ( M1 + M2 ) ) ) )*

1. *If M1, M2 and d are known, find t(1) from :*

*t = sqrt ( ( 4 \* π ² \* ( M2 / ( M1 + M2 ) ) \* d ³ ) / ( G \* M2 ) )*

1. *If M1, M2 and F are known, find d from :*

*d = sqrt ( ( G \* M1 \* M2 ) / F ) )*