AlTools Equations List

| Eq Group | Eq \# | Problem Description |
| :---: | :---: | :---: |
| Speed | 1 | Speed from Distance \& Drag |
|  | 2 | Constant Speed from Distance \& Time |
|  | 3 | Speed from Drag \& Time |
|  | 4 | Final Speed from Start Speed, Drag \& Time |
|  | 5 | Final Speed from Start Speed, Drag \& Distance |
|  | 6 | Start Speed from Final Speed, Drag \& Time |
|  | 7 | Start Speed from Final Speed, Drag \& Distance |
| Time | 10 | Time from Constant Speed \& Distance |
|  | 11 | Time from Speed \& Drag |
|  | 12 | Time from both Speeds \& Drag |
|  | 13 | Time from Distance \& Drag |
| Distance | 20 | Distance from Speed \& Drag |
|  | 21 | Distance from Constant Speed \& Time |
|  | 22 | Distance from Two Speeds \& Drag |
|  | 23 | Distance from Initial Speed, Drag \& Time |
| Acceleration Factor | 30 | Drag from Speed \& Distance |
|  | 31 | Drag from Speed \& Time |
|  | 32 | Drag from both Speeds \& Time |
|  | 33 | Drag from both Speeds \& Distance |
|  | 34 | Drag from Distance \& Time |
|  | 35 | Drag from Initial Speed, Distance \& Time |
|  | 36 | Drag from Road Friction, Brake Efficiency \& Grade |
|  | 37 | Drag from Force \& Weight |
| Linear Momentum | 40 | General Two Dimensional Linear Momentum |
|  | 41 | In Line General Linear Momentum |
|  | 42 | In Line Linear Momentum with Restitution |
|  | 43 | In Line Plastic Linear Momentum |
|  | 44 | In Line Elastic Linear Momentum |
| Special | 45 | Tangent-Offset |
|  | 46 | Radius from Chord and Mid-Ordinate |
|  | 47 | Critical Speed |
|  | 48 | Combined Speed from different Drag Surfaces |
|  | 49 | Combined Speed |
| Airborne | 50 | Speed from Horizontal Launch and Fall |
|  | 51 | Small Angle Speed at Launch Equation, $<10$ degs |
|  | 52 | General Projectile Speed Equation |
| Energy | 60 | Speed from Linear Kinetic Energy |
|  | 61 | Kinetic Energy from Speed and Weight |
|  | 62 | Force from Kinetic Energy and Distance |
|  | 63 | Distance from Kinetic Energy and Force |
| Motorcycle | 70 | Lateral Acceleration Factor from Speed and Radius |
|  | 71 | M/C Lean Angle from Speed and Radius |
|  | 72 | Turning Radius From Speed and Lateral Drag |
| Animation Assist | 80 | Speed from Start Speed, Start Time, Drag \& Time |
|  | 81 | Distance from Start Distance, Start Speed, Start Time, Drag \& Time |
| Reaction Times | 90 | Total Distance from P/R Time, Speeds \& Drag f |
|  | 91 | Total Distance from Start Speed, Times \& Drag f |
|  | 92 | P/R Time from Speeds, Total Distance \& Drag |
|  | 93 | P/R Time from Start Speed, Total Distance, Drag \& Time |
|  | 94 | Start Speed from Total Distance, Times \& Drag |
|  | 95 | Start Speed from Total Distance, Final Speed, P/R Time \& Drag |
|  | 96 | Drag from Speeds, P/R Time \& Total Distance |
|  | 97 | Drag from Start Speed, Total Distance \& Times |
|  | 98 | Total Time from P/R Time, Speeds \& Drag |
|  | 99 | Total Time from P/R Time Braking Distance \& Drag |

