



Vertical Axis Variable	Horizontal Axis Variable	Slope of a Line		Area “Under” a Curve	
		Variable (words)	Equation (symbols)	Variable (words)	Equation (symbols)
Position	Time	Velocity	$\vec{v} = \frac{\Delta \vec{x}}{\Delta t}$	None <sup>1</sup>	None
Velocity	Time	Acceleration	$\vec{a} = \frac{\Delta \vec{v}}{\Delta t}$	Change in Position or Displacement	$\Delta \vec{x} = \vec{v} \Delta t$
Acceleration	Time	Jerk <sup>2</sup>	$\vec{j} = \frac{\Delta \vec{a}}{\Delta t}$	Change in Velocity	$\Delta \vec{v} = \vec{a} \Delta t$
Spring Force	Displacement from Equilibrium Position	Negative of the spring constant (-k)	$F_s = -kx$ or $-k = \frac{F_s}{x}$	None	None
Acceleration	Mass	None	None	Net Force	$\sum \vec{F} = m\vec{a}$
Net Force	Acceleration	Mass	$\vec{a} = \frac{\sum \vec{F}}{m}$	None	None

<sup>1</sup> When I write “none”, I mean there is not a single variable I can think of which can fill the cell of the table (which you are responsible for knowing).  
<sup>2</sup> On the blank table I wrote “none” here. The jerk is not a part of any AP Physics curriculum; however, I could not have you wandering around telling people the slope of an acceleration as a function of time curve represents nothing, when that is incorrect. What kind of a teacher would I be then?



Vertical Axis Variable	Horizontal Axis Variable	Slope of a Line		Area “Under” a Curve	
		Variable (words)	Equation (symbols)	Variable (words)	Equation (symbols)
Force parallel to Displacement	Displacement	None	None	Work	$W = F_{\parallel}d = Fd \cos \theta$
Mechanical Energy	Time	Power	$P = \frac{\Delta ME}{\Delta t}$	None	None
Power	Time	None	None	Change in Mechanical Energy	$\Delta ME = P\Delta t$
Force parallel to Velocity	Velocity	None	None	Power	$P = F_{\parallel}v = Fv \cos \theta$
Momentum	Mass	Velocity	$\vec{v} = \frac{\vec{p}}{m}$ or $\vec{p} = m\vec{v}$	None	None
Velocity	Mass	None	None	Momentum	$\vec{p} = m\vec{v}$
Momentum	Time	Net Force	$\sum \vec{F} = \frac{\Delta \vec{p}}{\Delta t}$	None	None
Net Force	Time	None	None	Impulse or Change in Linear Momentum	$\Delta \vec{p} = \sum \vec{F}\Delta t$



Vertical Axis Variable	Horizontal Axis Variable	Slope of a Line		Area “Under” a Curve	
		Variable (words)	Equation (symbols)	Variable (words)	Equation (symbols)
Angular Position	Time	Angular Velocity	$\vec{\omega} = \frac{\Delta\vec{\theta}}{\Delta t}$	None	None
Angular Velocity	Time	Angular Acceleration	$\vec{\alpha} = \frac{\Delta\vec{\omega}}{\Delta t}$	Angular Displacement	$\Delta\vec{\theta} = \vec{\omega}\Delta t$
Angular Acceleration	Time	Angular Jerk <sup>3</sup>	$\vec{\gamma} = \frac{\Delta\vec{\alpha}}{\Delta t}$	Change in Angular Velocity	$\Delta\vec{\omega} = \vec{\alpha}\Delta t$
Net Torque	Angular Acceleration	Rotational Inertia	$I = \frac{\sum \vec{\tau}}{\vec{\alpha}}$ or $\sum \vec{\tau} = I\vec{\alpha}$	None	None
Angular Acceleration	Rotational Inertia	None	None	Net Torque	$\sum \vec{\tau} = I\vec{\alpha}$
Net Torque	Rotational Inertia	Angular Acceleration	$\vec{\alpha} = \frac{\sum \vec{\tau}}{I}$	None	None
Torque	Angular Displacement	None	None	Work	$W = \tau\Delta\theta$

<sup>3</sup> I think I may have found my new favorite insult, “Angular Jerk!” Good times. But again, not a part of any AP Physics curriculum. You may ignore all of this. I am clearly just entertaining myself at this point. Also unnecessary, that symbol for angular jerk is a lowercase, Greek letter gamma,  $\gamma$ .



Vertical Axis Variable	Horizontal Axis Variable	Slope of a Line		Area “Under” a Curve	
		Variable (words)	Equation (symbols)	Variable (words)	Equation (symbols)
Angular Momentum	Rotational Inertia	Angular Velocity	$\vec{\omega} = \frac{\vec{L}}{I}$ or $\vec{L} = I\vec{\omega}$	None	None
Angular Velocity	Rotational Inertia	None	None	Angular Momentum	$\vec{L} = I\vec{\omega}$
Angular Momentum	Time	Net Torque	$\sum \vec{\tau} = \frac{\Delta \vec{L}}{\Delta t}$	None	None
Net Torque	Time	None	None	Angular Impulse	$\vec{J}_{\text{angular}} = \Delta \vec{L} = \sum \vec{\tau} \Delta t$
Force Perpendicular to Surface	Surface Area	Pressure	$P = \frac{F_{\perp}}{A}$	None	None
Mass	Volume	Density	$\rho = \frac{m}{V}$	None	None
Gauge Pressure	Gravitational Field Strength times Depth	Density	$P = \rho gH \Rightarrow \rho = \frac{P}{gH}$	None	None